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В.Н.САКС и С.А.СТРЕЛКОВ

МЕЗОЗОЙ И КАЙНОЗОЙ СОВЕТСКОЙ АРКТИКИ

На территории Советской Арктики мезозойские отложения распространены весьма широко, причем преобладают морские фации. Можно утверждать, что здесь мы имеем наиболее полные в бореальной области разрезы триаса, юры и низов мела, охарактеризованные богатой фауной и микрофауной. Меловые лагунные и континентальные отложения также заключат обильную флору, допускающую разделение их по возрасту. Благодаря широкому размаху геологических исследований в северных областях Советского Союза и наличию во многих районах буровых скважин, мезозой Советского Севера к настоящему времени достаточно детально расчленен /это видно из составленной в Институте геологии Арктики геологической карты Советской Арктики в масштабе 1:2 500 000 /. Изучены и монографически описаны коллекции фауны, микрофауны, флоры, спорово-пыльцевые комплексы, литологический и фациальный состав осадочных толщ.

В отличие от мезозоя третичные отложения на севере Советского Союза встречаются лишь спорадически и слабее охарактеризованы флорой и в морских фациях фауной. Что касается четвертичных отложений, то они развиты очень широко и достигают большой мощности. Проведенные обширные геологические и геоморфологические исследования позволили достаточно дробно стратифицировать четвертичную толщу и легли в основу составленной в Институте геологии Арктики карты четвертичных отложений Советской Арктики в масштабе 1:2 500 000.

Триасовые отложения, распространенные в морских фациях главным образом в Верхояно-Чукотской геосинклинальной облас-

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ти, зачастую не отделены явственным перерывом от пермских. Как показал Ю.Н.Попов, здесь устанавливается полный разрез нижнего триаса, расчленяющийся на два яруса; нижний - индский с зонами /снизу вверх/: **Otoceras, Pachyproptychites u Paranorites** и верхний - оленекский с зонами **Dieneroceras** и **Olenekites**. Средний триас разделяется на анизийский яруск с зонами **Beyrichites** и **Frechites** и ладинский ярус с зонами **Neodalmatites** и **Nathorstites** В верхнем триасе в карнийском ярусе выделяются; нижний горизонт с **Sirenites, Protrachyceras, Daonella u Halobia zitteli Lindstr.** и верхний - с **Oxytoma** и **Halobia celtica Mojs.** В норийском ярусе по данным И.И.Ту кова также различаются нижний горизонт с **Pseudomonotis scutiformis Kipar.** и верхний - с **Monotis ochotica Keys.** Рэтский ярус хотя и недостаточно определенно устанавливается И.И.Тучковым на побережье Охотского моря и в бассейне Кольмы /слои с **Rhaetina pyriformis Suess, Zeilleria austrica Zug.** /.

Представлены триасовые отложения песчано-алевритовыми и глинистыми породами, причем последние преобладают; в верхнем триасе имеются прослои известняков, существенную роль приобретают вулканогенные образования.

К западу от Лены морские фации триаса доходят до восточного Таймыра включительно /рис.1/, при этом выделяются ярусы и карнийский ярус. Ладинскому, норийскому и рэтскому ярусам отвечают лагунно-континентальные отложения с листовой флорой /по заключению Н.А.Шведова в среднем триасе **Neocalamites carcinoides Harr.**, в верхнем триасе **Neocalamites aff.hoerensis Schimp., Glossophyllum spathulatum Pryn.**). Нижние горизонты триаса сложены вулканогенными образованиями, связанными с формацией траппов и содержащими в прослоях туф

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тов и осадочных пород филлопод / **Estheria gutta Lutk., E. aequale Lutk.** / и листовую флору **Podozamites lanceolatus Lindl. et Hutt.,Cladophlebis adnata Goepp., Retinosporites sibirica Neub./.** /. Эти образования распространены на больших площадях на севере средней Сибири, достигают огромной /до 2-2,5 км/ мощности и вполне возможно в таких случаях включат и более высокие горизонты триаса.

На севере Русской равнины триас представлен континентальным пестроцветными отложениями, охарактеризованными в нижней части рептилиями нижнего триаса, выше - рептилиями верхов среднего триаса и в верхней части листовой флорой и спорово-пыльцевыми комплексами, позволяющими выделить два горизонта, отвечающих нижний - карнийскому и норийскому ярусам и верхний - рэтскому ярусу. На Земле Франца Иосифа по данным В.Д.Дибнера и Л.П.Пирожникова появляются и морские отложения карнийского яруса с **Sirenites,** над которыми лежит лагуно-континентальная толща, включающая, судя по спорово-пульцевыми комплексам, карнийский и рэтский ярусы /слои с **Neocalamites sp.ind.aff.hoerensis** Schimp. /и низы юры /вероятно нижний лейас/.

Юрские отложения в большинстве областей Советской Арктики налегают на более древние породы с несогласием стратиграфическим, а нередко и угловым. Можно однако думать, что непрерывное осадкообразование в конце триаса и начале юры имело место во многих районах Верхояно-Чукотской геосинклинальной области, где в это время поднимались лишь своды антиклинориев

Наиболее полные разрезы нижнеюрских отложений /рис.2/ наблюдаются в Верхояно-Чукотской области. И.И.Тучков выделяет здесь геттангский ярус с **Schlotheimia, Psiloceras,** синемюрский ярус с **Arietites siverti sp.n.Tuch.,** ~~дм~~ домерский ярус с **Amaltheus u Harpoceras elegans Sow.**

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и тоарский ярус в нижней части с Dactylioceras и в верхней с Pseudolioceras compactile Simps. Преобладают глинисто-алевритовые осадки, большую роль играют вулканогенные породы. К западу от р.Лены заходят лишь глинисто-алевритовые отложения домерского и тоарского ярусов, первые с Amaltheus и различными видами Harpax, вторые с Dactylioceras, Pseudolioceras, Nannobelus, Mesoteuthis, Passaloteuthis, Eumorphotis (Arctotis) vai Bodyl Оба яруса охарактеризованы по данным А.А.Герке самостоятельными комплексами микрофауны, сходными с одновозрастными отложениями Аляски. Под домерским ярусом иногда лежат песчаные слои, на Вилюе континентальные, в Анабаро-Хатангском районе с Pseudomonotis lisabeti sp.n. Voron. . Эти слои могут относиться к нижнему лейасу или к низам среднего лейаса.

Средняя юра /рис.3/нередко ложится на нижнюю несогласно. В Лено-Енисейском и Приверхоянском прогибах, а также в Верхояно-Чукотской геосинклинальной области выделяются нижний аален с Pseudolioceras beyrichi Schloth., верхний аален с Ludwigia, , байос с пока еще недостаточно надежно определенными Hyperlioceras, Normannites, формами Megateuthis , верхний бат с Arctocephalites Каждому ярусу средней юры соответствуют свои комплексы видов Inoceramus и отчасти Eumorphotis (Arctotis), а также фораминифер и остракод. Преобладают в составе среднеюрских отложений глинистые породы, в верхних горизонтах все более возрастает роль песчано-алевритовых разностей. В Верхояно-Чукотской геосинклинальной общасти широко развиты и вулканогенные образования. На Земле Франца Иосифа имеется, по данным В.Д.Дибнера, аален с Ludwigia , бат с Arctocephalites , на байос приходится закрытая осыпями часть разреза, Cranocephalites

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найдены на валунах на Новой Земле. В пределах Западной Сибири и на севере Русской платформы морские фации появляются в конце средней юрской, и в начале поздней эрской эпохи, более древние средне- и отчасти нижнеюрские отложения представлены континентальными образованиями.

Верхнеюрские отложения, формировавшиеся в условиях миаксимального развития мезозойской трансгрессии /рис.4/, распространены очень широко, преобладают среди них глинистые осадки, в Верхояно-Чукотской области заметную роль играют и эффузивы и их туфы. Богатая фауна позволяет выделить ярусы и зачастую подъярусы и зоны. Нижний аеллювей - охарактеризован в нижней части Arcticoceras , а также Inoceramus и Eumorphotis (Arctotis) / сренеюрского типа, в средней части Cadoceras ognevi Bodyl.,в верхней C.elatmae Nik. и др. Средний келловей выделяется по Cadoceras milatscheviči Nik. , верхний келловей содержит Quenstedticeras (Longaeviceras), Cadoceras(Longaeviceras) nikitini Sok. . Нижний оксфорд заключает Cardioceras cordatum Sow верхний оксфорд - Amoeboceras alternans Buch,A.zieteni Rouill кимеридж в нижней части характеризуется Amoeboceras kitchini Salf., A.spathi sp.n. Schulg, Rasenia, к более высоким горизонтам приурочены Amoeboceras kochi Spath,A.sokolovi Bodyl., A.decipiens Spath. . На восточном склоне Северного Урала есть также верхний кимеридж с Aulacostephanus yo Orb. u A.pseudomutabilis Lor.

В основании нижнего волжского яруса лежит зона Pectinatites u Subplanites , выше зона Dorsoplanites и Pavlovia и наконец вверху зона Laugeites. . Верхний волжский ярус выделяется по находкам Craspedites okensis Orb., Cr.fragilis Trautsch.,

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новых эндемичных родов аммонитов (**Taimyroceras gen.nov. Bodyl.** и **Perisphinctidae**) и новых видов **Cylindroteuthis** (**C.superelongata Blüthgen, C.clavicula Anderson**).

В пределах Верхояно-Чукотской геосинклинальной области поднятие зарождающихся горных систем привело к постепенному сокращению моря на протяжении позднеюрской эпохи и к переходу на отдельных участках к формированию континентальных и лагунных осадков, охарактеризованных листовой флорой: **Raphaelia diamensis Sew., Cladophlebis aldanensis Vachr., Baiera ahnertii Krysht.** Усилившаяся в течение позднеюрской эпохи тектоническая активность земной коры обусловила внутри верхней юры многочисленные размывы, перерывы в осадконакоплении, выпадении из разреза отдельных ярусов. Эти явления наблюдаются на периферии зон мезозойского осадконакопления и на отдельных структурах внутри их во многих областях Советской Арктики. Особенно часто устанавливаются перерывы в пограничных с мелом горизонтах, благодаря чему верхний волжский ярус обнаруживается очень редко. Затрудняет выделение верхнего волжского яруса и разграничение его с валанжином также то, что фауны пелеципод / **Aucella** / и фораминифер в верхневолжских и нижневаланжинских отложениях почти неотличимы, а многие верхневолжские аммониты являются эндемиками.

Отложения низов нижнего мела, преимущественно глинистые, распространены почти также широко как верхнеюрские /рис.5/. Но уже в середине валанжина осушается Верхояно-Чукотская геосинклинальная область, морские условия сохраняются лишь на отдельных участках к востоку от Колымы, у подножья поднявшихся горных хребтов начинается накопление континентальных толщ молассового типа. К западу от

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Лены морской режим также сменяется лагунным и континентальным в готериве, а в Западной Сибири и на севере Русской равнины в барреме.

Валанжин расчленяется очень детально. В нижнем подъярусе, возможно заслуживающем выделения в самостоятельный ярус, различаются две зоны - нижняя с Subcraspedites и Paracraspedites и верхняя с Tollia и разнообразными Acroteuthis. Средний подъярус с Euryptychites, Polyptychites michalskii Bog. и Cylindroteuthis harabylensis sp.nov. Sachs разделяется, хотя и не везде, на две зоны - нижнюю с Temnoptychites и верхнюю с Astieriptychites gen.nov.Bodyl. Верхний подъярус заключает Dichotomites, Neocraspedites, Bochianites demissus sp.n.Bodyl.

Нижний готерив в Лено-Енисейском прогибе выделяется условно, охарактеризован Aucella sublaevis Keys., Cylindroteuthis pachsensis sp.nov.Sachs и отвечает времени регрессии раннемелового моря. В Западной Сибири и в области Баренцова моря морские отложения сохраняются до верхнего готерива /слои с Speetoniceras, Aulacoteuthis cf.absolutiformis Sinz., Cylindroteuthis necopinus sp.n.Gust./ Морские осадки продолжали формироваться вплоть до баррема также в проливе к востоку от Колымы, соединявшем Арктический и Тихоокеанский бассейны /слои с Simbirskites /

В барреме и отчасти в море почти целиком покидает территорию современной суши в Советской Арктике /рис. 6/. По мере отступания моря, местами с валанжина, местами с готерива и баррема, на огромных пространствах откладываются мощные лагунные и континентальные угленосные толщи. В районе Земли Франца Иосифа, на севере Сибирской платформы и особенно интенсивные в Верхояно-Чукотской геосинклинальной области происходят излияния эффузивов, в преде-

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лах последней области одновременно внедряются крупные интрузии гранитоидов. Стратиграфия нижнемеловых континентальных отложений основывается на остатках листовой флоры и на изучавшихся Э.Н.Кара-Мурза спорово-пыльцевых комплексах. По данным Н.Д.Василевской и В.А.Вахрамеева выделяются слои с флорой нижнего неокома /**Coniopteris setacea Pryn., Cadophlebis pseudolobifolia Aldania Vachr.**/ и с солоноватоводными моллюсками /**Corbula cf.sowerbyi Forb.,C.cf.sedgwickii Forb.** /, слои с флорой верхнего неокома (**Nilssonia jacutica Sam.,Jacutiella amurensis Sam., Ctenis burejensis Pryn.**) и слои с флорой апт-альба (**Coniopteris onychioides Vas. et K.-M., Gleichenia lobata Vachr.,Adiantites, Podozamites reinii Geyl., Ginkgo adiantoides Ung.**). В этих последних отложениях впервые обнаруживаются покрытосеменные /листья **Sassafrass kolymensis Pryn., Betulaceae**).

В апте морские отложения вновь устанавливаются на берегах Баренцова моря /валуны с **Deshayesites** на Новой Земле/, условно допускаются в Западной Сибири, а также в Анадырско-Корякской области /на севере заложившейся в меловом периоде Охотско-Ниппонской геосинклинали/. Здесь к апту могут относиться слои с **Aucellina aptiensis Orb.** , лежащие несогласно на неокоме. В раннем и среднем альбе /рис.7/ морской режим фиксируется в районе Новой Земли, на Пай-Хое, в Западной Сибири /слои с **Cleoniceras, Balduroceras, Arcthoplites jachromensis Nik.**), прослои с морской микрофауной известны среди лагунно-континентальных толщ Лено-Енисейского прогиба, расширяется область развития морских отложений в Анадырско-Корякской области /слои с **Cleoniceras, Inoceramus cf.anglicus Woods.** /. Верхний альб в пределах Советской Арктики

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пока по фауне не выделяется, хотя присутствие его в морских фациях можно предполагать в Западной Сибири и в Анадырско-Корякской области.

Морской сеноман имеет почти такое же распространение как альб - слои с Schloenbachia aff.subvarians Spath найдены В.Д.Дибнером на Земле Франца Иосифа, валуны с Schloenbachia varians Sow. есть на полуострове Канине, в Западной Сибири отвечают сеноману слои с Entolium balticus Dam. . По-прежнему широким развитием пользовались континентальные и прибрежные осадки, но в отличие от нижнего мела они представлены не песчано-глинистыми разностями, формировавшимися зачастую в лагунах и озерах, а существенно песчаными отложениями прибрежно-морскими, дельтовыми и аллювиальными с янтарем, листовой флорой сеномантурона /Menispermites kryshtofovichii Vachr., Dalbergites simplex Neub. Cissite близкий к C.ingens Lesq. / и редкой пыльцой покрытосеменных.

В Анадырско-Корякской области морской сеноман-турон /гиляцкая серия, песчано-галечные и вулканогенные породы/ с Puzosia planulata Sow., Inoceramus concentricus Park. var. nipponicus Nag. et Mat. налегает с угловым несогласием на все более древние образования.

В туроне морские условия распространились на западную часть Лено-Енисейского прогиба. Здесь, а также на севере Западной Сибири, выделяются на основе изученной В.И.Бодылевским фауны нижний турон с Inoceramus labiatus Schloth., верхний турон-коньяк с Borissiakoceras aff.mirabile Arkh., Inoceramus lamarcki Park., In.interruptus Schm., коньяк с In.russiensis Nik, нижний сантон с In.pachti Arkh.,

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кампан с Baculites obtusus Meek, Scaphites cuvieri Mart., маастрихт с Baculites anceps Lam. var.leopoliensis Now. Tancredia americana Meek. Максимум позднемеловой трансгрессии приходится на поздний сантон /рис.8/, когда море проникло на востоке в бассейн Хатанги, на западе в Печорскую впадину и на Пай-Хой. Широко развились в это время диатомовые водоросли /Stephanopyxis schulzii Stein и др./, вероятно определившие появление кремнистых осадков - опок, а также одноклеточные водоросли - перидинеи. В датском веке море, по-видимому, покинуло северные окраины Западно-Сибирской низменности, морские отложения этого времени вообще не известны в районах, прилегающих к Арктическому бассейну.

В Анадырско-Корякской области присутствуют морские отложения ороченской серии, зачастую чередующиеся с туфогенными, и в нижней части содержащие по даннымВ.Н.Верещагина коньякских Kossmaticeras, выше сантонских Inoceramus patootensis Lor., , еще выше появляются Inoceramus schmidti Mich., In.sachalinensis Sok. /кампан?/, наконец в верхней части серии есть маастрихтские Brahmaites, Pachydiscus neubergicus Hauer. Датский ярус по фауне не выделяется. Характер фауны верхнего мела Анадырско-Корякской области не оставляет сомнения в том, что соединение Тихоокеанского и Арктического бассейнов скорее всего через восточную часть Сьюордского полуострова существовало по крайней мере до кампана.

Среди верхнемеловых континентальных отложений, развитых у подножья горных систем Верхояно-Чукотской области и на Новосибирских островах, могут быть, по данным В.А.Вахрамеева, выделены сенон с Trochodendroides, Viburnum, Platanus, Credneria, Protophyllum, Macclintockia и датский ярус с

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Asplenium, Trochodendroides, Zizyphus, Alnus, Populus, Viburnum.
Широко распространены в Верхояно-Чукотской области и особенно в Охотско-Чаунской зоне верхнемеловые эффузивы и туфы. Есть они и на севере Сибирской платформы. Формировались в подзднемеловую эпоху также интрузивы /в Колымо-Чукотской и Анадырско-Корякской областях/.

Морские отложения палеогена известны лишь на севере Западной Сибири и в Анадырско-Корякской области. В Западной Сибири выделяются палеоцен /песчано-глинистые породы с Ammobaculites foliaceous Brady u Cibicides lunatus Brotz.), эоцен /опоки и диатомиты со Spiroplectammina carinata Orb., и нижний олигоцен /глины с Meretrix incrassata Sow. /. Вполне возможно, что Западно-Сибирский и Арктический бассейны не сообщались между собой, так как на крайнем севере низменности наблюдаются более мелководные фации. В Анадырско-Корякской области палеоцен-нижний эоцен представлен континентально-лагунными, реже морскими образованиями /с Corbicula ex gr.snatolensis L.Krisht., Memocardium aff.marysvillensis Dick., Viburnum,Grewiopsis, Trochodendroides, Juglans),

средний и верхний эоцен и нижний и верхний олигоцен выделяются по фауне пелеципод.

Континентальные, возможно частично лагунные отложения палеогена устанавливаются у подножья горных систем Верхояно-Чукотской области, на Новосибирских островах, в отдельных впадинах на Сибирской платформе. По комплексам листовой флоры выделяются палеоцен /с Trochodendroides arctica Heer, Nordenskiöldia borealis Heer/, нижний эоцен / с Taxites olrikii Heer, Quercus platania Heer /, верхний эоцен /с Corylus kenaiana Holl. Juglans juglandiformis Sternb. /. Вулканогенные породы палеогена пользуются как и верхнемеловые, широким развитием на северо-

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востоке Сибири, особенно в Анадырско-Корякской области. Наряду с эффузивами и туфами известны и интрузивы разнообразного состава.

Неоген в морских фациях на берегах Арктического бассейна не обнаружен, только в Корякской области появляются морские осадки с пелециподами нижнего, среднего и верхнего миоцена и нижнего и среднего плиоцена. По-видимому, в основном береговая линия Арктического бассейна в неогене располагалась севернее современной. Даже континентальные отложения неогена встречаются редко, их почти нет и на севере Западно-Сибирской низменности и в Енисейско-Ленском прогибе. Лишь в Верхояно-Чукотской и Анадырско-Корякской областях и на Лене неогеновые осадки в предгорных и межгорных прогибах приобретают более широкое распространение, в нижних горизонтах они содержат миоценовых Populus, Juglans, Taxodium, Metasequoia, в верхних горизонтах охарактеризованы флорой, переходной к нижнечетвертичной (Juglans, cinerea L. и др./. Широко развиты в Анадрыско-Корякской области вулканогенные породы неогена.

Стратиграфическое расчленение четвертичных /антропогеновых/ отложений Советской Арктики основано на отражающихся в осадках крупных изменениях географической обстановки /климатических условий и вызываемых ими чередований оледенений и межледниковых эпох/, что подкрепляется закономерным изменением флоры и растительности, а также сменой комплексов фауны млекопитающих и экологических комплексов фауны морских моллюсков. Все более заметную роль

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в расчленении играют также результаты изучения донных осадков Северного Ледовитого и Тихого океанов и их окраинных морей.

В отложениях четвертичной системы /антропогена/ отчетливо устанавливаются следы двух крупных материковых оледенений и вероятные следы третьего /наиболее древнего/ оледенения. Отложения двух последних оледенений разделяются осадками бореальной трансгрессии, представляющими собой определенный опорный горизонт. Морские отложения известны также между моренами древнего и среднего крупных оледенений. Последедниковая или современная эпоха отвечает установлению существующих ныне географических условий.

Таким образом, по существенным изменениям географической среды, которые имели планетарный масштаб, более или менее одновременно проявляясь во всем северном полушарии, можно пытаться сопоставить стратиграфические схемы различных удаленных друг от друга территорий.

Три упомянутых больших оледенения отвечают минделю, риссу и вюрму альпийской схемы и, видимо, канзасу, иллинойсу и висконсину Северной Америки. Бореальная трансгрессия соответствует еемской трансгрессии Западной Европы.

В принятой в последнее время в СССР схеме расчленения четвертичного периода /антропогена/ граница последнего проводится под слоями, соответствующими виллафранку Западной Европы, т.е. верхний плиоцен в его прежнем понимании относится к антропогену, являясь нижним отделом последнего Средний отдел включает три яруса, каждый из которых охватывает межледниковые слои и последующие ледниковые. Верхним отделом антропогена является голоцен, отвечающий послеледниковый и современной эпохам.

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В пределах северной части СССР к нижнему отделу антропогена /эоплейстоцену В.И.Громова/ относятся отложения, встречающиеся к востоку от р.Лены и содержащие флору, в которой сочетаются неогеновые и антропогеновые элементы. Это - песчано-глинистые осадки, нередко с железистым цементом; присутствуют также эффузивы и туфы. В составе флоры сочетаются хвойные элменты /**Pinus monticola Dougl., P.sect. pinaster et paracembra, Picea wollosowiczii Suk., P.jacutica Wask., P.obovata Ldb.)** и широколиственные, в частности **Juglans cinerea L.** К ним же приурочены определенные Э.А.Вангейнгейм находки фауны млекопитающих, относящихся к хапровскому и тираспольскому комплексам В.И.Громова /**Elephas meridionalis Nesti, Equus süssenbornensis Wüst, Eq. stenonis Cocchi).**

Вероятно, к началу антропогена относятся морские отложения с **Glycimeris yessoensis, Cardita pultunensis** и др. на северном побережье Охотского моря. Одновозрастными, судя по составу фауны, являются осадки наиболее высоких речных террас /УШ терраса р.Лены, У1 терраса рр.Вилюя и Мархи/.

Условно к нижнему антропогену отнесены плотные супеси из долины р.Курейки, содержащие остатки таежной флоры (**Larix sibirica Ldb., Alnus sp., Andromeda polifolia L.)** отличающиеся необычаной высокой степенью фоссилизации.

Средний отдел антропогена охватывает все ледниковые и межледниковые отложения, кроме голоцена.

Отложения нижнего яруса среднего отдела антропогена сохранились также почти исключительно на Северо-Востоке СССР. Это пески и галечники, налегающие на описанные выше осадки и

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содержащие хвойную флору из тех же или близких видов, но уже без широколиственных элементов. Это, видимо, аллювиальные доледниковые отложения рек, стекавших с обновленных горных систем.

В Западной Сибири предположительно доледниковые маломощные песчанистые глины лежат глубоко в погребенных долинах и содержат пыльцу и споры третичных и четвертичных растений.

В бассейне р.Вилюя к этому времени относится аллювий У и 1У террас, в которых найдены **Elephas Wüsti M.Pavl. и Rhinoceros Mercki Jaeg.**

На Чукотке к началу среднего антропогена отнесены морские пески с **Cardium ciliatum Fabr.** и др. Вопрос о трансгрессии моря в Западной Сибири остается окончательно нерешенным.

Осадки среднего яруса среднего антропогена также сохранились плохо, благодаря преобладанию процессов сноса в эту эпоху. Во внеледниковой зоне Сибири это, в основном, аллювиальные песчаные и галечно-песчаные отложения террас долин крупных рек /1У терраса бассейна среднего течения р.Енисея, У терраса бассейна р.Вилюя/. В осадках встречаются остатки **Bison priscus longicornis W.Grom. u Elephas trogontherii** Pohl., относимые В.И.Громовым к среднему плейстоцену/хозарский комплекс фауны/.

В пределах территории, покрывавшейся средним наиболее значительным из всех оледенением, поэтому получившим в Сибири название максимального, более древние речные террасы уцелели лишь частично. На Югорском полуострове, в Северо-Сибирской низменности, на севере Западной Сибири изредка встречаются глины, суглинки и пески с морской

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фауной, причем некоторые виды не попадаются в составе фауны более молодой бореальной трансгрессии /Littorina saxatilis Ol., Cardium edule L., Nucula sp. /. По всей вероятности они указывают на трансгрессию моря, происходившую перед максимальным оледенением и соответствующую голштинской П.Вольдштедта.

Морена максимального для Сибири оледенения, сопоставляемого с днепровским Европейской части СССР, рисским альпийской схемы и, вероятно, иллинойским Америки, распространена очень широко /рис.9/. На севере морена обычно сохранилас в перемытом и частично переотложенном виде - это маломощные слегка сцементированные валунно-галечные накопления. Типичная морена и водно-ледниковые пески встречаются редко.

На Северо-Востоке СССР максимальное оледенение оставило слабые следы только в горах. Возможно, что на Чукотском полуострове оно происходило при высоком положении берегово линии моря.

В Западной Сибири к югу от 66-ой параллели нередко наблю дается разделение морены максимального оледенения на два горизонта, разделенных пачкой песков. Это может указывать на существование двух стадий оледенения /самаровской и тазовской/. Их предположительно можно сопоставлять с днепровским и московским оледенениями Европейской части СССР и, либо, с иллинойским и айовским оледенениями Северной Америки, либо с двумя стадиями иллинойского оледенения.

Отложения верхнего яруса среднего отдела формировались, в условиях преобладающего погружения, поэтому они достигаю большой мощности. Они налегают с размывом на отложения максимального оледенения, чаще - непосредственно на дочетвертичные породы.

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В западной части Сибири /западнее р.Анабар/ и на севере Европейской части СССР, как видно на рис.10, хорошим опорным горизонтом являются межледниковые осадки бореальной трансгрессии /еемской в Западной Европе/.

В Западной Сибири В.Н.Саксом они разделены на три свиты. Нижняя песчаная мессовская свита с очень бедной фауной /**Macoma baltica L.** /отлагалась в прибрежных и дельтовых условиях. Средняя песчано-глинистая санчуговская свита отвечает глубоководным условиям. Она содержит комплекс фауны со значительным количеством видов нижней части сублиторали, обитающих в арктических условиях /**Neaera arctica L.,Portlandia lenticula Möll.,Propeamussium groenlandicum Sow.**). В верхней части свиты, по данным М.А.Лавровой и С.Л.Троицкого, появляются песчаные пачки, содержащие прибрежную фауну (**Macoma baltica L., Mytilus edulis L.**).

Верхняя песчаная казанцевская свита отвечает более низкому положению уровня моря при максимуме проникновения атлантических вод. Фауна на севере Европейской части СССР содержит лузитанские элементы / **Mactra elliptica L.** /, в Западной Сибири - бореальные / **Pholas crispata L.,Cyprina islandica L.** /, хотя встречаются и эвритермные и даже холодноводные виды.

На побережье Чукотского полуострова бореальные отложения занимают неширокую полосу. Возможно, морские условия существовали здесь непрерывно с века максимального оледенения. В фауне много видов / **Astarte hemicymata** и др./, отсутствующих вдоль северных берегов Сибири. Это указывает на небольшую роль водообмена через Берингов пролив в течение четвертичного периода.

Длительность бореальной трансгрессии определяется

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Н.Н.Лапиной в 40 тысяч лет по материалам изучения донных осадков Северного Ледовитого океана /от 65 до 105 тысяч лет тому назад/.

Морские отложения бореальной трансгрессии с фауной слагают с поверхности лишь ограниченные участки полуостровов Ямала и Гыданского и некоторых островов Советской Арктики.

К югу и к востоку от основной области трансгрессии одновременны бореальной трансгрессии аллювиальные пески и галечники, слагающие Ш террасу бассейнов рр.Енисея, Оленека и Лены. В осадках встречаются остатки млекопитающих верхнепалеолитического комплекса / **Elephas primigenius Blum.** раннего типа и др./.

На Средне-Сибирском плоскогорье в век бореальной трансгрессии происходила перестройка речной сети под влиянием дифференцированных тектонических подвижек и связанное с этим накопление озерных осадков - суглинков с конкцециями.

Отложения зырянского оледенения /рис.11/, сопоставляемого с вюрмским альпийской схемы и висконсинским Северной Америки, налегают с размывом на межледниковые, а в горных районах - на дочетвертичные. В речных долинах и в предгорьях располагаются моренные пояса и гряды, сложенные мореной, литологический состав которой соответствует геологическому строению центров зарождения оледенения. На равнинах морена встречается редко, там преобладают то пески флювиогляциального облика с косой слоистостью и прослоями галечников, то неслоистые пески или суглинки с рассеянным обломочным материалом. Последние отложены малоактивным оледенением, ледяные покровы которого возникали при снижении снеговой границы до уровня местности и вследствие небольшой мощности и отсутствия заметных уклонов ложа, были почти неподвижны.

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Основными центрами питания оледенения были: Таймырско-Североземельский, Путоранский, Уральский, Новоземельский, Анабарский. На Северо-Востоке СССР местными центрами являлис отдельные горные хребты /Верхоянский, Черского, Колымский/.

В расположении краевых форм отчетливо отражается климатическая закономерность убывания активности оледенения по направлению к востоку. Сравнивая число и расположение крупных серий краевых образований ледников различных центров устанавливается не менее трех стадий зырянского оледенения. Первые две /караульская и ньяпанская в Западной Сибири/, сопоставляются с калининским и осташковским оледенениями Европейской части СССР /по А.И.Москвитину/. Менее уверенно их можно параллелизовать со стадиями айова-тейзуелл и кэри висконсинского оледенения Северной Америки. Последняя крупная заключительная горно-долинная сартанская стадия, отделенная периодом потепления /каргинским веком/, может приблизительно соответствовать фенноскандинавским стадиям Европы и объединенным манкейто-вальдерс Северной Америки.

Зырянские отложения вверх по разрезу сменяются позднепослеледниковыми зандровыми, озерно-аллювиальными и аллювиальными отложениями. Это комплекс супесей, суглинков и песков, содержащих наиболее часто встречаемые остатки "мамонтовой" фауны /в том числе мамонт позднего типа/. Эти отложения названы В.Н.Саксом каргинскими. Формирование их ранее связывалось с морскими условиями, но сейчас работами С.Л.Троицкого и В.Д.Дибнера установлен их континентальный генезис.

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В долинах крупных рек каргинские отложения слагают вторую надпойменную террасу, будучи отделены размывом от зырянских отложений. В то же время в обширных депрессиях на севере Западной Сибири устанавливается постепенный переход от зырянских отложений к каргинским. Для каргинских отложений Северо-Востока характерно наличие эпигенетических клиновидных грунтовых льдов.

Каргинские отложения нередко венчаются торфяниками, в которых вплоть до широты 72-73° встречены остатки деревьев Торфяники большинством исследователей считаются также каргинскими, отражающими период потепления /возможно, соответствующий межстадиалам аллеред или беллинг Западной Европы и ту - крикс или аркона-лейк Северной Америки/, которое, однако, в условиях континентального климата Сибири было выражено более резко. Береговая линия каргинского времени располагалась, в основном, севернее современного ее положения.

На прибрежных равнинах Северо-Востока СССР осадконакопление озерно-аллювиальных или временами прибрежно-лагунных фаций могло происходить непрерывно, от среднечетвертичной эпохи до каргинского века. На это указывают постепенные изменения состава фауны млекопитающих.

Отложения сартанской стадии оледенения выделяются только в горных областях, где они налегают на каргинскую террасу.

Продолжительность всего зырянского оледенения по сопоставлению с выделяемыми горизонтами и мощностью донных

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осадков Северного Ледовитого океана определяется Н.Н.Лапиной в 55 тысячелетий, в том числе сартанской стадии в 10 тысяч лет, каргинского века в 10-12 тысяч лет и обеих покровных стадий в 30-33 тысячи лет.

Современный отдел четвертичного периода /антропогена/ голоцен, продолжительностью 9-10 тысяч лет, охватывает разнообразные по генезису отложения, занимающие, однако, небольшие площади на геологической карте. В речных долинах это аллювий первой надпойменной террасы, которая в Сибири еще иногда продолжает заливаться, начинающей формироваться поймы и русловые осадки. Для первой надпойменной террасы характерно наличие торфяников, образовавшихся в период послеледникового климатического оптимума. На морских побережьях в современную эпоху формировались низкие террасы и косы. Озерные отложения особенно широко развиты на прибрежных низменностях Северо-Востока СССР, где они слагают впадины осушенных термокарстовых озер /"аласы"/. Эоловые отложения не имеют широкого развития в Артике. Элювиальные и делювиальные отложения распространены широко, но изучены еще недостаточно, поэтому их возрастное расчленение пока невозможно.

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V.N.Sachs and S.A.Strelkov

MESOZOIC AND CENOZOIC OF THE SOVIET ARCTIC

(Report for the First International Symposium on Arctic Geology to be held in Canada. January 11-13, 1960).

In the Soviet Arctic the Mesozoic formations are distributed very widely, the marine facies being dominant. It may be stated that here we have the most complete boreal succession of the Triassic, Jurassic and Lowest Cretaceous formations, characterized by abundant faunas and microfaunas. The lagoonal and continental Cretaceous deposits also include abundant floras enabling their chronological division. Owing to large scale geological investigations in the northern regions of the Soviet Union and to available wells in many of the regions the Mesozoic of the Soviet North has now subdivision detailed enough. (It is seen from the geological map of the Soviet Arctic at scale 1:2500000 drawn up by the Institute of Geology of the Arctic). Fauna, microfauna and flora collections, spore complexes, lithological and facial compositions of sedimentary successions have been studied and monograpnycally described.

In contrast to the Mesozoic, the Tertiary formations occur sporadically in the Soviet North and have less floral and marine faunal evidence.

As for the quaternary formations they are distributed very widely attaining great thicknesses. Large scale geological and geomorphological investigations permitted a detailed enough stratigraphical division of the Quaternary succession. On this base a map of the Quaternary formations

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of the Soviet Arctic at scale 1 : 2500000 has been drawn up by the Institute of Geology of the Arctic.

The Triassic formations widespread in marine facies, mainly in the Verkhoyansk-Chukchi geosyncline area are not separated from the Permian by a distinct hiatus. As shown by G.N.Popov, a complete succession of the Lower Triassic has been established there, which may be divided into two stages: the lower one named Induan Stage upward with the Otoceras, Pachyproptychites and Paranorites zones and the upper one named Olenekian Stage with the Dieneroceras and Olenekites zones. The Middle Triassic can be divided into the Anizian stage with the Beyrichites and Frechites zones and the Ladinian stage with the Neodalmatites and Nathorstites Zones . In the Upper Triassic the following Carnian horizons are distinguished: the lower horizon with Sirenites, Protrachyceras, Daonella and Halobia zitteli Lindstr. and the upper one with Oxytoma and Halobia celtica Mojs. In the Norian stage according to I.I.Touchkov it is also possible to distinguish the lower horizon with Pseudomonotis scutiformis Kipar. and the upper one with Monotis ochotica Keys. The Rhaetian is established by I.I.Touchkov on the coast of the Sea of Okhotsk and in the Kolyma basin although without certitude (the beds with Rhaetina pyriformis Suess, Zeilleria austriaca Zug.).

The Triassic formations are represented by sandy, aleurite and clay, the latter being dominant; in the Upper Triassic formations limestone is imbedded and volcanic rocks acquire an important role.

Westward of the Lena river the Triassic marine facies overlap the eastern Taimyr (fig.1) including the upper part

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of the Induan stage, the Olenekian and Anizian stages and the Carnian stage. The lagoonal-continental deposits with leaf moulds correspond to the Ladinian, Norian and Rhaetian stages (N.A.Shwedov reported Neocalamites carcinoides Harr. from the Middle Triassic; Neocalamites aff.hoerensis Schimp. and Glossophyllum spathulatum Pryn. from the Upper Triassic). The lower horizons of the Triassic consist of volcanic rock varieties related with the trap series and containing phyllopods (Estheria gutta Lutk., E.aequale Lutk.) and leaf impressions (Podozamites lanceolatus Lindl. et Hutt., Cladophlebis adnata Goepp., Retinosporites sibirica Neub.) in the imbedded tuffite and sediment. These formations are widely distributed in the north of Middle Siberia, they reach enormous thicknesses (up to 2-2,5 km) and may include in those cases the higher horizons of the Triassic too.

In the north of the Russian plain the Triassic formations are represented by continental variegated deposits with the Lower Triassic reptiles near the base; upward with the Upper Middle Triassic reptiles and with leaf impressions and spore complexes near the top that permits to distinguish two horizons, the lower one corresponding to the Carnian and Norian stages and the upper one corresponding to the Rhaetian stage. There occur according to the data of V.D.Dibner and L.P.Pirozhnikov in the Franz Joseph Land also marine deposits of the Carnian stage with Sirenites, overlain by lagoon-continental succession which include with respect to spore complexes the Norian and Rhaetian stages (beds with Neocalamites sp.ind. aff.hoerensis Schimp.) and the Lower Jurassic deposits (probably the Lower Lias).

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The Jurassic formations of most of the Soviet Arctic rest above the older rocks with a break and often with angular unconformity too. One can think however that the sedimentation at the end of Triassic and at the beginning of the Jurassic proceeded without any break in many lolocalities of the Verkhoyansk-Chukchi geosyncline area where only the arch uplifts of anticlinoria took place at that time. The most complete succession of the Lower Jurassic formations (fig.2) is found in the Verkhoyansk-Chukchi area. I.I.Touchkov distinguishes the Hettangian stage with Schlotheimia, Psiloceras, the Sinemurian stage with Arietites siverti sp.n. Tuch., the Pliensbachian stage with Uptonia jamesoni Sow., Pseudoamaltheus laevis Qu., the Domerian stage with Amaltheus and Harpoceras elegans Sow. and the Toarcian stage with Dactylioceras in its lower part and with Pseudolioceras compactile Simps. in the upper one.

Into the region West of the Lena river there penetrate only the clayey aleurite deposits of the Domerian and Toarcian stages, the first ones with Amaltheus and various species of Harpax, the second ones with Dactylioceras, Pseudolioceras, Nannobelus, Mesoteuthis, Passaloteuthis, Eumorphotis (Arctotis) vai.Bodyl.

Both stages are characterized according to A.A.Gerke by distinct microfaunal complexes similar to those in the formation of the same age in Alaska. The Domerian stage rests sometimes above the sandy beds which are of continental origin on the Vilui river but in the Anabar-Khatanga region contain Pseudomonotis lisabeti sp.n. Voron. These beds may be dated as the Lower Lias or the lower Middle Lias.

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The Middle Jurassic formations (fig.3) rest often with unconformity above the Lower Jurassic. In the Lena-Yenisei trough and the Verkhoyansk range foredeep as well as in the Verkhoyansk-Chukchi geosyncline area we distinguish the Lower Aalenian with Pseudolioceras beyrichi Schloth., the Upper Aalenian with Ludwigia, the Bajocian with Hyperlioceras and Normannites, not yet identified with certitude, the Lower Bathonian with Morrisiceras, Cranocephalites, minor forms-Megateuthis, the Upper Bathonian with Arctocephalites. Each stage of the Middle Jurassic has its own assemblages of Inoceramus and partly of Eumorphotis (Arctotis) species as well as of foraminifers and ostracods. Clayey rocks prevail in the Middle Jurassic. Sandy aleurite become more and more significant upward to the top. Volcanic formations are also widely distributed in the Verkhoyansk-Chukchi geosyncline area. According to data of V.D.Dibner there occur the Aalenian with Ludwigia and the Bathonian with Arctocephalites on the Franz Joseph Land where a scree slope obscurs the Bajocian rocks in the same succession. Species of Cranocephalites have been found in the boulders of Novaya Zemlya.

By the end of the Middle Jurassic and at the beginning of the Late Jurassic there appeared marine facies within West Siberia and in the northern part of the Russian platform, where the older Middle Jurassic formations and partly the Lower Jurassic ones are represented by deposits of continental origin.

Upper Jurassic formations that originated under conditions when the Mesozoic transgression reached its maximum (fig.4) are widely distributed. Their clay constituent is dominant;

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in the Verkhoyansk-Chukchi area both lavas and their tuffs are of importance. Abundant fauna permits to distinguish some stages and rather often substages and zones. The faunal evidences of the Lower Callovian are: Arcticoceras as well as Inoceramus and Eumorphotis (Arctotis) of the Middle Jurassic type in its lower part,Cadoceras ognevi Bodyl. in its middle part and C.elatmae Nik. and others near the top. Cadoceras milascheviči Nik. indicates the Middle Callovian. The upper Callovian beds contain Quenstedticeras (Longaeviceras), Cadoceras (Longaeviceras) nikitini Sok. In the Lower Oxfordian Cardioceras cordatum Sow. is found while Amoeboceras alternans Buch., A.zieteni Rouill. are reported from the Upper Oxfordian. The faunal evidences of the lower part of the Kimmeridgian are Amoeboceras kitchini Salf., A.spathi sp.n. Schulg., Rasenia, but there are Amoeboceras kochi Spath., A.sokolovi Bodyl., A. decipiens Spath in higher horizons. Following the eastern slope of the Northern Urals we meet also with the Upper Kimmeridgian with Aulacostephanus yo Orb. and A.pseudomutabilis Lor.

The base of the Lower Volgian stage is defined by the Pectinatites and Subplanites Zone; the Dorsoplanites and Pavlovia Zone comes upward and finally at the top we see the Laugeites Zone. The founds of Craspedites okensis Orb. and Cr.fragilis Trautsch. the new endemic ammonite genera (Taimyroceras gen. nov.Bodyl. and Perisphinctidae) and Cylindroteuthis (C.superelongata Blüthgen, C.clavicula Anderson indicate the Upper Volgian Stage. Within the Verkhoyansk-Chukchi geosyncline area the uplift of the originating mountain systems lead to a gradual recession of the sea during the Late Jurassic and to the local accumulation of

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continental and lagoonal deposits with following floral evidence: Raphaelia diamensis Sew., Cladophlebis aldanensis Vachr., Baiera ahnertii Krysht.

The tectonic activity became more intensive during the Late Jurassic producing within the Upper Jurassic numerous erosion effects, breaks and lacks in successions. These phenomena can be observed on the periphery of the zones of the Mesozoic sedimentation and on single structural features of their internal parts in many regions of the Soviet Arctic. Especially frequent breaks occur near the Cretaceous boundary and hence the Upper Volgian stage can be established in a few cases only. In addition, the fact that the pelecypod (Aucella) and foraminifera faunas of the Upper Volgian and Lower Valanginian formations are almost equal and many Upper Volgian ammonites are endemic hampers the distinguishing of the Upper Volgian stage and the determination of the boundary between this stage and the Valanginian.

The lowest Lower Cretaceous formations consisting mostly of clay are widespread in the same degree as the Upper Jurassic ones (fig.5). But by the middle of the Valanginian the Verkhoyansk-Chukchi geosyncline area became dry land, the marine environment continued in existence only in some localities eastward of Kolyma and at the foot of the elevated mountain ranges the continental succession of the molasse type started to accumulate. Northward of the Lena river the marine environment is also substituted in the Hauterivian by the lagoonal and continental ones while in West Siberia and in the north of the Russian Plain this event took place in the Barremian.

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The Valanginian has a very detailed subdivision. Two zones can be distinguished in the lower substage which probably deserve to be taken as a distinct stage. There are two zones: of Subcraspedites with Paracraspedites (the lower one) and of Tollia with various Acroteuthis (the upper one). The middle substage with Polyptychites michalskii Bog. and Cylindroteuthis karabylensis sp.n. Sachs is divided (although not everywhere) into two zones: of Temnoptychites and (upward) of Astieriptychites gen. nov. Bodyl. The upper substage includes Dichotomites, Neocraspedites, Bochianites demissus sp.n. Bodyl.; in the Lena-Yenisei trough the Lower Hauterivian is distinguished tentatively having faunal evidence such as Aucella sublaevis Keys., Cylindroteuthis pachsensis sp.n. Sachs and being contemporaneous with the recession of the Early Cretaceous sea. In West Siberia and in the region of the Barents sea the marine deposits continued forming up to the Upper Hauterivian beds with Speetoniceras, Aulacoteuthis absolutiformis Sinz., Cylindroteuthis necopinus sp.n.Gust.) and up to the Barremian in the strait wich was situated eastward of the Kolyma river connecting the Arctic and Pacific basins (beds with Simbirskites).

In the Barremian and sometimes in the Bathonian the sea leaves almost completely the territory of the modern dryland in the Soviet Arctic (fig.6). With the recession of the sea thick lagoonal and continental coalbearing successions began to accumulate on enormous territories in some places from the Valanginian and in others from the Hauterivian and the Barremian. Lava explosions take place in the Franz Joseph Land region in the north of the Siberian platform and with especial intensity in the

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Verknoyansk-Chukchi geosyncline area as well as major granite rock intrusions within the latter region.

The stratigraphy of Lower Cretaceous continental formations is based on floral evidence and on spore complexes studied by E.N.Kara-Murza. According to data of N.D.Vassilevskaya and V.A.Vachrameev we distinguish beds with the Lower Neocomian flora (Coniopteris setacea Pryn., Cladophlebis pseudolobifolia Vachr., Aldania) and the semi-marine mollusca (Corbula cf.sowerbyi Forb., C.cf.sedgwickii Forb.); beds with the Upper Neocomian flora Nilssonia jacutica Sam., Jacutiella amurensis Sam., Ctenis burejensis Pryn.) and beds with the Apt-Albian flora (Coniopteris onychioides Vas. et K.-M., Gleichenia lobata Vachr., Adiantites, Podozamites reinii Geyl., Ginkgo adiantoides Ung. It is in these beds that Angiospermae (leaves of Sassafrass kolymensis Pryn. and pollen of Betulaceae) have been found for the first time. In the Aptian formations marine deposits are established again on the Barents Sea coast (boulders with Deshayesites found on Novaya Zemlya) and are tentatively assumed to exist in West Siberia as well as in the Anadyr Koryak region (north of the Okhotsk-Nippon geosyncline, brought about in the cretaceous). In this area the beds with Aucellina aptiensis Orb., resting with unconformity on the Neocomian, seem to be Aptian. For the Early and the Middle Albian (fig.7) the marine environment is known in the Novaya Zemlya region in the Pay-Khoy range in West Siberia (beds with Cleoniceras, Beudanticeras, Arcthoplites jachromensis Nik.). Some deposits with marine micro-

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fauna are imbedded among the lagoonal continental successions of the Lena-Yenisei trough. There expanded the area of the marine formation development in the Anadyr-Koryak region (beds with Cleoniceras, Inoceramus cf. anglicus Woods).

There is no possibility as yet to distinguish with faunal evidence the Upper Albian within the Soviet Arctic, although we can assume its presence in the marine facies of West Siberia and the Anadyr-Koryak mountain region.

The marine Cenoman has almost the same distribution as the Albian marine formations. Beds with Schloenbachia aff. subvarians Spath have been found by V.D.Dibner on Franz Joseph Land. There are boulders with Schloenbachia varians Sow. on the Kanin peninsula. In West Siberia the beds with Entolium balticus Dam. correspond to the Cenomanian. The continental and littoral deposits were widespread as before but in contrast to the Lower Cretaceous they were not sandy-clay varieties formed rather often in the lagoons and lakes, but essentially sandy rocks of littoral, deltaic and alluvial type with amber and the Cenoman-Turonian flora (Menispermites kryshtofovichii Vachr., Dalbergites simplex Newb., Cissites, close to C.ingens Lesq.) and occasionally with the pullen of Angiospermae.

In the Anadyr-Koryak region the Cenoman-Turonian marine deposits (the Ciliakian formation, the sandy-pebble, and volcanic rocks) with Puzosia planulata Sow., Inoceramus concentricus Park.var.nipponicus Nag. et Mat. rest with an angular unconformity above the whole succession of older rocks.

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Marine environment in the Turonian spanned the western part of the Lena-Yenisei trough. Here and in the north of West Siberia from the evidence of fauna studied by V.I.Bodylevski we can distinguish the Lower Turonian with Inoceramus labiatus Schloth.; the Upper Turonian-Coniacian with Borissiakoceras aff.mirabile Arkh., Inoceramus lamarcki Park., In.interruptus Schm., the Coniacian with In. russiensis Nik., the Lower Santonian with In.pachti Arkh., the Upper Santonian with In.patootensis Lor., In.steenstrupi Lor., Oxytoma tenuicostata Roem., the Campanian with Baculites obtusus Meek., Scaphites cuvieri Mart., the Maestrichtian with Baculites anceps Lam. var.leopoliensis Now., Tancredia americana Meek.

The Late Cretaceous transgression reached its maximum in the Late Santonian (fig.8) when the sea penetrated into the basin of the Khatanga river in the east, and into the Pechora trough and in the Pay-Khoy hills in the west. Diatoms (Stephanopyxis schulzii Stein and others) are widespread at that time causing probably the appearance of the siliceous deposits the so called gaize, as well as the unicellular algae Pyrrophyta. In the Danian age the sea is believed to leave the northern limits of the West-Siberian plain, marine sediments of that time beeing in general unknown in the regions by the Arctic basin.

In the Anadyr-Koryak region the marine Orochonian Formation~~s~~ often interbedding with tufaceous deposits contains according to V.N.Vereshchagin Coniacian Kossmaticeras-near the base; Santonian Inoceramus patootensis Lor., Gaudryceras - in higher horizons; Campanian Inoceramus schmidti Mich., In. Sachalinensis Sok.-in still higher horizons and finally Maestrichtian Brahmaites, Pachydiscus neubergicus Hauer-near the top. We have no faunal evidence for distinguishing the Danian stage here.

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The character of faunas in the Upper Cretaceous of the Anadyr-Koryak region leaves no doubt that connection between the Pacific and the Arctic basins most probably through the eastern part of the Seward peninsula continued in existence at least until the Campanian.

Among the Upper Cretaceous Continental formations deposited at the foot of the mountain structures of the Verknoyansk-Chukchi region and on the New Siberian Islands two following stages may be distinguished according to V.A.Vachrameev: the Senonian with Trochodendroides, Viburnum, Platanus, Credneria, Protophyllum, Macclintockia and the Danian with Asplenium, Trochodendroides, Zizyphus, Alnus, Populus, Viburnum. In the Verkhoyansk-Chukchi region and especially in the Okhotsk-Chaun zone the Upper Cretaceous lavas and tuffs are widely distributed. They are found in the north of the Siberian platform as well. There occurred intrusions too in the Late Cretaceous time (in the Kolyma-Chukchi and Anadyr-Koryak regions).

The marine Paleogene is known only in the northern part of West Siberia and in the Anadyr-Koryak regions. In West Siberia we can distinguish the paleocene (sandy-clay rocks with Ammobaculites foliaceous Brady and Cibicides lunatus Brontz.), the Eocene (gaize and diatomite with Spiroplectammina carinata Orb.) and the Lower Oligocene (clays with Meretrix incrassata Sow.).

It is quite possible that there was no connection between the West-Siberian and Arctic basins because of the presence of more shallow water facies in the northernmost part of the plain. In the Anadyr-Koryak mountain

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region the Paleocene-Lower Eocene formations are represented by continental lagoonal, more seldom by marine deposits (with Carbicula ex. gr. anatolensis L. Kright., Nemocardium aff. marysvillensis Dick., Viburnum, Grewiopsis, Trochodendroides, Juglans). The Middle and Upper Eocene and the Lower and Upper Oligocene can be distinguished on the base of pelecypod fauna.

The continental and in addition, probably, the lagoonal Paleogene is found at the foot of the mountain structure of the Verkhoyansk-Chukchi region, on the New Siberian islands and in single troughs within the Siberian platform. The paleocene (with Trochodendroides arctica Heer, Nordenskiöldia borealis Heer), the Lower Eocene (with Corylus kenaiana Holl., Juglans juglandiformis Sternb.) and the Upper Eocene (with Corylus kenaiana Holl., Juglans juglandiformis Sternb.) are distinguished on the base of leaf impressions. Volcanic rocks of Paleogene age as well as the Upper Cretaceous ones are widely distributed in the north-east of Siberia, especially in the Anadyr-Koryak region, Parallel with the lavas and their tuffs a variety of intrusions is known here.

Marine facies of the Neogene have not been revealed along the stretch of the Arctic coast and only in the Koryak mountain area there appear marine deposits with the Lower, Middle, and Upper Miocene and Lower and Middle Pliocene pelecypods.

The Neogen shore line in general may have been situated further north than the modern one. Even the continental deposits of Neogene age are found sporadically being absent in the north of the West-Siberian plain and in the Lena-

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Yenisei trough.

It is only in the Verkhoyansk-Chukchi and Anadyr-Koryak regions and on the Lena river that the Neogen sediments in the external and internal troughs become more widely distributed containing in the lower horizons the Miocene Populus, Juglans, Taxodium, Metasequoia, but in the upper horizons with floral evidence approaching to that of the Lower Quaternary (Juglans cinerea L. and others). There are the widespread volcanic rocks of Neogen age in the Anadyr-Koryak region.

The Quaternary (Anthropogene) stratigraphy of the Soviet Arctic is based upon the lithologic reflection of considerable changes of the geographical environment, such as the climate conditions and the consequent alternation of glaciations and interglacial periods.

This fact is shown by the natural sequence of flora and the change of plant types as well as by the change of mammalia assemblages and of the ecological complexes of marine mollusca. The results of the bottom sediment study in the Arctic and Pacific Oceans and their border seas also grows in importance as for the Quaternary stratigraphy.

The traces of two great continental glaciations and probably of a third (the oldest) glaciation are distinctly established in the Quaternary (Anthropogene) formations.

The sediments of the Boreal transgression separate the formations of two last glaciations respectively forming a marked bed. Marine deposits are also known imbedded between two moraines of the old and middle

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glaciation. The beginning of the postglacial or recent epoch corresponds to the time, when the modern geographical conditions set in.

From the considerable changes of the geographical environment spanning the globe as a whole and being more or less contemporaneous in the northern hemisphere one can try to correlate the stratigraphic scales of different localities separated from each other by great distances. Three great glaciations noted above correspond to the Mindel the Riss and the Würm of the Alps and probably to the Kansan, the Illinoian and the Wisconsin of North America. The Boreal transgression corresponds to the Eemian transgression in Western Europe.

According to the recent standard scale of the Quaternary (Anthropogene) stratigraphy accepted in the Soviet Union the boundary of this period is drawn up immediately below the beds correlated with the Villafranchian of Western Europe, the Anthropogene contains the Upper Pliocene in its former meaning forming the lower series of the latter. The middle series comprises three stages, each stage including the interglacial beds and the subsequent glacial drift. The upper series of the Anthropogene is the Holocene or the postglacial epoch.

Within the northern part of the Soviet Union the lower series of the Anthropogene includes sediments occuring eastward of the Lena river and containing flora with neogene and anthropogene features. These beds consist of sandy clay often cemented by iron oxides, lavas and tuffs being present as well. The flora consists of conifers (Pinus monticola Dougl., P.sect pinaster et paracembra, Picea wollosowiczii Suk. P.jacutica Wask., P.obovata Ldb.) combined with broadleaved plants in particular Juglans cinerea

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L. Some mammalia fauna has been collected from the same beds and reported by E.A.Vangenheim as belonging to the assemblages of the Khapry Sand and the Tiraspol Gravel (Elephas meridionalis Nesti, Equus süssenboranensis Wüst, Eq.stenonis Cocchi).

The beginning of the Anthropogene may have produced the marine deposits with Hlycymeris yessoensis, Cardita pultunensis and others on the northern coast of the Sea of Okhotsk. The fauna assemblages show the same age of the sediments of the highest river terraces (the eighth-level terraces of the Lena river, the seventh-level terraces of the rivers Vilui and Markha). We can tentatively attribute to the lower Anthropogene the consolidated sandy soils in the Kureyka valley, containing fossil floras of the taiga type (Larix sibirica Ldb., Alnus sp., Andromeda polifolia L.), with an extremely high degree of fossilization.

The middle series of the Anthropogene comprises all the beds of both glaciation and interglaciation periods except the Holocene.

Formations of the lower stage of the Anthropogene middle series are of only local extent in the North-East of the USSR. These sands and pebbles rest on the beds described above and contain coniferous flora consisting of the same or similar species but without broadleaved members. They are probably preglacial fluvial deposits of rivers which flowed down from the renewed mountain structures.

It is supposed that in West Siberia the thin beds of preglacial sandy clay occur deep in buried valleys con-

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taining the pollen and spores of the Tertiary and Quaternary plants.

In the Vilui river basin the alluvium on the fifth-level and fourth-level terraces with founds of Elephas Wüsti M.Pavl. and Rhinoceros Mercki Jaeg. are believed to date from that time.

In the Chukchi peninsula marine sand with Cardium cilliatum Fabr. is attributed to the beginning of the Middle Anthropogene. The problem of the marine transgression in West Siberia remains still controversial.

Formations of the middle stage of the Middle Anthropogene are mostly eroded owing to the predominance of the peneplanation processes in that epoch. In the ice-free zone of Siberia these are in the main sandy and pebblesandy fluvial deposits of valley terraces of the great rivers (the fourth-level terraces of the Middle Yenisei basin; the fifth-level terraces of the Vilui basin). The fossil mammalia found in these beds are: Bison priscus longicornis W.Grom. and Elephas trogontherii, attributed by V.I.Gromov to the Middle Pleistocene (the Khazar assemblage).

Only some of the older terraces remain within the area, which was subjected to the largest middle glaciation called in Siberia the "Maximum Glaciation").

In the Yugor peninsula, in the North-Siberian plain and in the north of West Siberia rare clay, loam and sand occur containing marine fauna, several species being absent in the faunal assemblage of the Younger Boreal transgression (Littorina saxatilis (?) Ol., Cardium edule L., Nucula sp.). From this evidence the transgressio

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of the sea is believed to have taken place before the Maximum Glaciation and to correlate with the Holstein transgression reported by F.Woldstedt.

The morаines of the Maximum Glaciation (in Siberia) correlated with the Dnieper-Don glaciation in the European part of the USSR, with the Riss of the Alps and probably with the Illinoian of America are widely distributed (Fig.9). In the north of Siberia the moraine usually occur in ~~a~~ the form of washed off and redeposited matter, representing thin, slightly cemented pebble-boulder accumulations. Typical moraines and aqueoglacial sands are found but occasionally.

In the North-East of the USSR the Maximum Glaciation left but poor traces in mountains only. It is possible that in the Chukchi peninsula it took place when the shore line position was high.

In West Siberia, south of the latitude 66° sand is often found imbedded in moraines of the Maximum Glaciation dividing them into two separate moraine horizons. This fact shows two substages of glaciation (the Samarevo and the Taz). They may be correlated with the Dnieper-Don and Moscow glaciations of the European part of the USSR, and with the Illinoian and Iowan glaciations of North America, or with two phases of the Illinoian glaciation. Deposits of the upper stage of the middle series were forming under conditions of predominant submurgence stimulating their great thicknesses. The rest with erosional unconformity above the Maximum Glaciation drift,

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more often they are in direct contact with prequaternary rocks.

In the western part of Siberia (west of the Anabar river) and in the north of the European part of the USSR, as shown in fig.10, the interglacial deposits of the boreal transgression (the Eemian in Western Europe) represent a good marker bed.

In West Siberia they have been divided by V.N.Sachs into three members. The lowest of them, i.e. the sandy Messo river member with very poor fauna (Macoma baltica L.) was formed under littoral and deltaic conditions. The middle one of these three, i.e. the sandy-clayey Sanchugovka river member corresponds to the deep-water conditions. It contains a faunal assemblage with a considerable number of species typical of the lower sublittoral and inhabiting under Arctic conditions (Neaera arctica L., Portlandia Lenicula Möll., Propeamussium groenlandicum Sow.). According to M.A.Lavrova and S.L.Troitsky there appear sandy beds near the top, containing latteral fauna (Macoma baltica L., Mytilus edulis L.).

The uppermost of them i.e. the sandy Kazantseva river member corresponds to a lower sea level with a maximum penetration of Atlantic waters. In the north of the European part of the USSR the fauna contains the Lusitanian element (Mactra elliptica L.), while in West Siberia it contains the Boreal one (Pholas crispata L., Cyprina islandica L.), although there occur eurythermal and even coldwater species too.

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The Boreal deposits occupy a rather narrow stretch of the Chukchi peninsula coast. It is possible that marine conditions have continued here since the Maximum Glaciation. The fauna contains many species (Astarte hemicymata and others) which are absent along the northern coast of Siberia. This fact shows the negligible role of water interpenetration through the Bering Srait during the Quaternary. The duration of the Boreal transgression is of 40 thousand years (65 to 105 thousand years ago as determined by N.N.Lapina from the study of the Arctic ocean bottom sediment.

The marine fossiliferous sediments of the Boreal transgression are exposed only in some restricted areas of the Jamal and Gydan peninsulas and of some islands of the Soviet Arctic.

South and east of the main transgression area there occur fluvial sands and pebbles which underlie the third-level terraces of the Yenisei, Olenek and Lena basins and are contemporaneous with the Boreal transgression. The deposits contain some fossil mammals of the Upper-Paleolithic assemblage (Elephans primigenius Blum. of the early type and others).

In the Central-Siberian plateau during the Boreal transgression time there was going on the reworking of river systems under the influence of differentiated tectonic movements. This fact is related to the lacustrine sediment accumulation, i.e. to the deposition of loam with concretions. The glacial drift of the Zyryanka glaciation (fig.11) correlated with the Würm of the Alps and with the

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Wisconsin of North America, rests with an erosional unconformity above the interglacial deposits and in the mountain regions it rests above the Pre-quaternnary ones. In the valleys and foothills there are morainic loops and bands with a lithologic composition which corresponds to the geological structure of the glacier reservoirs. In the plains the moraine occurs but rarely. Either sand of fluvioglacial appearance with cross-beading and pebbles imbedded or unstratified sand and loam with scattered debris are dominant there. The latters were deposited by a glaciation of low activity. Its ice sheets appeared when the snow line lowered down to the altitude of the locality because of their small thicknesses and negligible channel grades being almost immobile.

The principal glacier reservoirs were as follows: the Taimyr-Severnaya Zemlya, the Putorana mountain, the Ural mountains, the Novaya Zemlya, and the Anabar river areas. The local glacier reservoirs in the North-East of the USSR were some isolate mountain ridges (the Verkhoyansk, Chersky, Kolyma mountains and others).

The distribution of lateral forms shows ditinctly an eastward decrease of the glaciation activity in accordance with climate. When comparing the number and distribution of large lateral formations of glaciers of different reservoirs not less than three phases of the Zyryanka glaciation can be established. The first two (the Karaul and the Nyapan substages in West Siberia) are correlated with the Kalinin and Ostashkov glaciation in the European part of

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the USSR (after A.I.Moskvitin). It is less probable that they have their equivalents in the Tazewell and Cary substages of the Wisconsin glaciation of North America. The last of them, i.e. the great final mountain - valley Sartan phase following a rather warm period of the Kargin age may be tentatively correlated with the Fennoscandia substages in Europe and the combined Mankato and Valders in North America.

The Zyryanka drift is followed in the upward continuation by the late postglacial sandr, fluviolacustrine and fluvial deposits. In these loams, sandy loams and sands the "mammoth" remains (the mammoth of the latest type inclusive) occur most frequently.These deposits are named the Kargin beds by V.N.Sachs. Their formation was attributed earlier to marine conditions, but now thanks to the examination carried out by S.L.Troitsky and V.D.Dibner their continental origin is proved to be real.

In the great river valleys the Kargin beds form the second terrace being separated from the Zyryanka drift by an erosion surface. At the same time, the Zyryanka drift grades into the Kargin beds in vast depressions in the north of West Siberia. Typical of the fluviolacustrin Kargin beds in the north-east of the USSR are epigenetic ground-ice wedges.

Peat is common at the top of the Kargin beds where up to lat.72-73° some tree remains have been found. Most of the investigators consider this peat being also of Kargin age and reflecting the warm period which probably corresponds to the Allerod or Bölling oscillations of Western

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Europe and to the Two Creeks or Lake Arkona intervals of North America. But under the continental climate conditions of Siberia the warm interval was more conspicuous. In the Kargin time the greatest part of the shoreline was situated further north if compared to its modern position.

In the coastal plains in the North-East of the USSR the sedimentation of the fluviolacustrine or sometimes the littoral-lagoonal facies may have been continuous from the Middle Quaternary up to the Kargin age. The gradual change of the mammal fauna supports this suggestion. The Sartan drift is established only in the mountain regions where it rests above the Kargin terrace. The total duration of the Zyryanka glaciation is 55 t y, including the Sartan substage of 10 t y, the Kargin age of 10-12 t y and both the ice-sheet substages of 30-33 t y, as determined by N.N.Lapina from the correlation of the horizons distinguished with the bottom sediment thicknesses in the Arctic Ocean.

The recent series of the Quaternary (Anthropogene) i.e. the Holocene which spans 9-10 thousand years includes a variety of deposits of different origin which occupy but small spots on the geological map. They are represented by the alluvium of the first terrace (this terrace is still sometimes flooded in Siberia) as well as by the alluvium of the flood-plain lobe and by the river bed gravel. Occurences of Beat formed in the period of the climatic Optimum are typical of the first terrace above the flood plain. Low level terraces and spits are formed on the sea shores in the Holocene. Lacustrine sediments are especially abundant in the coastal plains in the North-East of the USSR, where they fill the basins of the dried up thaw

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lakes ("alasses"). Eolian deposits are not widely developed in the Arctic. The eluvial and scree deposits are widely distributed but have not yet been studied enough which makes their chronological dating impossible for the time being.

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КОРРЕЛЯЦИОННАЯ ТАБЛИЦА ОТЛОЖЕНИЙ МЕЛОВОЙ СИСТЕМЫ В СОВЕТСКОЙ И ЗАРУБЕЖНОЙ АРКТИКЕ

Отдел	Ярус	Зона	Район Баренцева моря (в границах СССР)	Север Западно-Сибирской низменности	Енисейско-Ленский прогиб	Приверхоянский прогиб
Верхний (Cr2)	Датский (Dn)			Глины с Anomalina praeacuta, Globigerina varianta	—	Пески с Asplenium, Trochodendroides, Populus, Zizyphus, Platanus
	Маастрихт (Mst)		—	Глины и мергели с Baculites vertebralis, B.sibiricus, Gaudriceras pygmaeum	Пески с Baculites anceps v.leopeliensis, Tancredia americana	Пески и песчаники с Trochodendroides, Macclintockia, Credneria, Protophyllum, Viburnum, Nordenskioldia borealis
	Кампан (Cmp)			Глины и опоки с Baculites cf.obtusus, Scaphites cuvieri	Глины и алевриты с Inoceramus sp.	
	Сантон верхний (Snt2)		Песчаники и глины с Inoceramus patootensis, Oxytoma tenuicostata	Глины и опоки с Inoceramus steenstrupi, Oxytoma tenuicostata	Глины и алевриты с Inoceramus patootensis, In.steenstrupi, Oxytema tenuicostata	
	Сантон нижний (Snt1)			Глины и опоки Actinocamax ex gr.verus, A.cf.propinquus	Алевриты с Inoceramus pachti	
	Коньяк (Cn)		—	Глины и опоки с Inoceramus cf.anomalis	Алевриты и пески с Inoceramus subinvolutus, In.russiensis, In.sachsi	
	Турон верхний (Tur2)			Глины с Baculites romanovskii, Gaudryina filiformis	Алевриты с Inoceramus lamarcki, In.interruptus, In.inaequivalvis, Borissjakoceras	Пески и песчаники с [illegible], [illegible], Dalbergites, Cissites, Sterculia
	Турон нижний (Tur1)			Глины с [illegible]ramus cf.labiatus, Gaudryina filiformis	Глины с Placenticeras cf.planum, Inoceramus cf.labiatus, Gaudryina cf.filiformis	
	Сеноман (Cm)		Песчаники и алевролиты с Schloenbachia varians Schl. aff.subvarians, Oxytema pectinata	Алевролиты с Entolium ex gr.balticus, Inoceramus aff.amdariensis, Verneuilina asanoviensis	Пески и песчаники с Podocarpoxylon gothani	
Нижний (Cr1)	Альб верхний (Alb3)		?	Глины и алевролиты с Cleoniceras cf.bicurvatoides, Inoceramus anglicus, Ammobaculites agglutinans, Verneuilina praeasanoviensis, Milliammina rasilis	Угленосные отложения с Verneuilina praeasanoviensis, Milliammina rasilis, Ginkgo aff.pseudoadiantoides major, Sequoia sp.	Угленосные отложения с Asplenium aff.dicksonianum, Coniopteris adiantoides
	Альб средний (Alb2)		Песчаники с Cleoniceras, Baldure-ceras ?			
	Альб нижний (Alb1)					
	Апт (Apt)		Песчаники с Deshayesites Базальты, туфы и песчаники с Cladophlebis rigida, Podozamites graminens, Pityophyllum staratschini	Глины, алевролиты и песчаники с Mansisaurus sp.	Угленосные отложения с Ginkgo huttonii, Phoenicopsis angustifolia	Угленосные отложения с Sphaenobaiera, Podozamites, Jacutiella amurensis
	Баррем (Br)			Аргиллиты и алевролиты с Sphenopteris cf.fittonii, Podozamites lanceolatus		
	Готерив верхний (Ht2)		Песчаники и глины с Simbirskites	Глины, алевролиты и песчаники с Speetoniceras, Aulacoteuthis cf.absolutiformis, Cylindroteuthis necopinus	Угленосные отложения и Coniopteris nympharum, Podozamites eichwaldii, Corbula cf.sowerbyi, C.cf.sedgwickii	Угленосные отложения с Cladophlebis lenaensis, Cl.williamsonii, Corbula cf.sedgwickii, C.cf.sowerbyi
	Готерив нижний (Ht1)		? Песчаники с Cyrena cf.uvatica, C. cf.venulina	Песчаники, алевролиты и глины с Lingula	? Песчаники и алевролиты с Polyptychites, Aucella sublaevis, Cylindroteuthis pacnsensis	
	Валанжин верхний	Dichotomites bidichotomus	Глины с Dichotomites, Polyptychites polyptychus	Глины с Dichotomites ex gr.polytomus, Neocraspedites liapinensis	Глины и алевриты с Dichotomites, Neocraspedites, Bochianites demissus	Песчаники с растительными остатками
	Валанжин средний	Astieriptychites astieriptychus	Песчаники с Euryptychites gravesiformis, Temnoptychites hoplitoides	Глины с Polyptychites aff.keyserlingi	Глины и алевриты с Astieriptychites, Polyptychites ramulicosta, Euryptychites	Песчаники, алевролиты, аргиллиты с Astieriptychites, Euryptychites, Polyptychites
		Temnoptychites syzranicus		Глины с Temnoptychites triptychiformis	Глины и алевриты с Temnoptychites, Euryptychites, Polyptychites aff.keyserlingi	
	Валанжин нижний	Tollia tolli	Песчаники с Tollia cf.stenomphala	Глины с Tollia stenomphala, T.sibirica, T.anabarensis, Aucella inflata	Глины и алевриты с Tollia, Acroteuthis lateralis, Aucella crassa	Песчаники и алевролиты с Tollia, Aucella inflata
		Paracraspedites spasskensis	Песчаники и глины с Paracraspedites spasskensis	Глины с Paracraspedites, Subcraspedites, Garniericeras tolliense, Aucella volgensis	Глины, алевролиты и песчаники с Paracraspedites, Subcraspedites, Aucella volgensis	Глины и песчаники с Paracraspedites, Aucella volgensis

Верхояно-Чукотская область	Анадырско-Корякская область	Аляска	Северная Канада	Гренландия	Шпицберген
Угленосные отложения, эффузивы и туфы с Trochodendroides, Cephalotaxopsis, Sequoia, Ginkgo	Угленосные отложения с [illegible]ndroides, Magnolia, [illegible], Viburnum, Asplenium		Угленосные отложения, эффузивы		
	Песчаники, аргиллиты, туфы с Pachydiscus neubergicus, Brahmaites	—		—	
	Песчаники, конгломераты, туфы с Eupachydiscus sp., Inoceramus cf.balticus	Слои с Parapuzosia, Pachydiscus		Сланцы с Acanthoscaphites quadrangularis, A.greenlandicus	
	Аргиллиты и туфы с Inoceramus patoetensis, Anapachydiscus naumanni, Eupachydiscus cf.levyi			Сланцы и песчаники с Inoceramus patoetensis, In.steenstrupi, Oxytema tenuicostata	
	Аргиллиты и туфы с Inoceramus cardissoides	Алевролиты и туффиты с Inoceramus aff.cardissoides		Песчаники и сланцы с Inoceramus ex gr.cardissoides	
	Песчаники, аргиллиты, туфы Kossmaticeras, Inoceramus ex gr.lamarcki	Слои с Inoceramus vancouverensis	Сланцы	Сланцы с Scaphites ventricosus	—
	?	Сланцы и песчаники с Inoceramus cuvieri, In.lamarcki, In.subalatus	Песчаники и сланцы с углями с Scaphites, Watenoceras, Inoceramus labiatus	Песчаники с Scaphites aff.lamberti, Prionotropis cf.woolgari, Borissjakoceras, Inoceramus lamarcki	
Угленосные отложения, эффузивы и туфы с Cladophlebis frigida, Ginkgo adiantoides, Sequoia obovata, Quereuxia, Thuja, Viburnum	?	Сланцы и песчаники с Scaphites delicatulus, Inoceramus labiatus, Borissjakoceras			
	Песчаники, аргиллиты, туфы с Tetragonites, Turrilites costatus, Inoceramus concentricus v.nipponicus	Песчаники и алевролиты с Inoceramus athabaskensis	Сланцы и песчаники с Beudanticeras, Gastroplites, Hoplites	Сланцы и песчаники с Schloenbachia, Gaudryceras, Inoceramus crippsi, In.pictus	
Угленосные отложения, эффузивы и туфы с Coniopteris onychioides, Ginkgo adiantoides, Sassafras kolymaensis	Песчаники, алевролиты, известняки и туфы с Sonneratia, Sandrioceras, Cleoniceras, Stolizkaia, Beudanticeras, Inoceramus anglicus	Сланцы и песчаники с Cleoniceras, Lemuroceras, Gastroptites, Aucellina, Inoceramus anglicus		Сланцы и песчаники с Inoceramus anglicus, Aucellina caucasica	Песчаники с Arcthoplites cf.jachromensis
			Песчаники и сланцы с	Песчаники и сланцы с Hoplites, Dimorphoplites, Euhoplites, Gastroplites	
				Песчаники и сланцы с Arcthoplites cf.jachromensis, Beudanticeras cf.hulenense	
	Песчаники, аргиллиты, туфы с Aucellina aptiensis		Песчаники	Сланцы с Sanmartinoceras	Сланцы с Crioceras arcticum, Cr.gracile, Aucellina aff.caucasica, Inoceramus spitzbergensis
				Песчаники с Deshayesites, Ancyloceras aff.matheronianina	
			Сланцы с Crioceras cf.remondi, Aconeceras, Acroteuthis, Aucellina		Угленосные отложения с Ginkgo digitata
Песчаники с Simbirskites		—	Сланцы с Oxyteuthis jasikowi, Ox. pugio v.rimata		Угленосные отложения с Pityophyllum lindströmi
					Угленосные отложения Lioplax polaris
					Угленосные отложения с Elatides curvifolia
? Сланцы с Aucella sublaevis	? Сланцы с Aucella sublaevis	? Сланцы с Aucella sublaevis	? Песчаники с Aucella	? Красные песчаники с Lyticoceras, Aucella	? Песчаники с Pecten ex gr.spitzbergensis
Сланцы и песчаники с Aucella keyserlingi, A.crassicollis, A.sublaevis, A.crassa	Сланцы, алевролиты, песчаники, туфы с Aucella inflata, A.keyserlingi, A.ex gr.sublaevis, A.crassicollis	A.crassicollis, A.crassa	Песчаники и алевропелиты с Aucella crassicollis	Известняки, песчаники, сланцы, гравелиты с Polyptychites, Neocraspedites	Сланцы с Dichotomites beani, Aucella sublaevis
			Песчаники и алевропелиты с Euryptychites aff.latissimus, E.globulosus	Известняки, песчаники, сланцы, гравелиты с Polyptychites, Euryptychites	Сланцы с Polyptychites quadrifidus
Сланцы и песчаники с Aucella volgensis, A.terabratuloides	Сланцы, алевролиты, песчаники и туфы с Aucella lahuseni, A. volgensis, A.terebratuloides, A.fischeriana	Сланцы с Aucella okensis,	Сланцы с Tollia cf.tolli, T.cf.payeri, Aucella volgensis	Сланцы с Tollia payeri	Сланцы с Subcraspedites subpressulus, Aucella volgensis, A.trigonoides, A.okensis
				Сланцы с Hectoroceras kochi	
			Сланцы с Subcraspedites cf.suprasubditus, Aucella okensis	Сланцы с Praetollia maynei	
				Конгломераты с Paracraspedites aff.spasskensis	

КОРРЕЛЯЦИОННАЯ ТАБЛИЦА ОТЛОЖЕНИЙ ПАЛЕОГЕНОВОЙ И НЕОГЕНОВОЙ СИСТЕМ В СОВЕТСКОЙ АРКТИКЕ

Система	Отдел	Подотдел	Север Западно-Сибирской низменности	Север Средней Сибири	Верхояно-Чукотская область	Анадырско-Корякская область
Неоген	Плиоцен	верхний		Пески с растительными остатками	Аргиллиты, песчаники, сланцы, конгломераты с Juglans cinerea, пыльцой широколиственных деревьев	Угленосные отложения, эффузивы, туфы с Mya.arenaria v. japonica
		средний				Конгломераты, песчаники с Glycimeris snatolensis, Anadara trilineata
		нижний				Песчаники, туфы с Swiftopecten swiftii v.etchegoini, Tellina pulchra
	Миоцен	верхний	Алевриты и глины с растительными остатками, Melosira islandica		Угленосные отложения с Sequoia langsdorfii, Taxodium dubium, Macoma nasuta, Arca obispoana	Песчаники, конгломераты с Glycimeris chitanii, Mytilus chejsleveemensis
		средний				Песчаники, конгломераты, эффузивы, туфы с Yoldia ex gr. choensis, Cardita korfensis
		нижний				Аргиллиты с Nuculana napanica, Yoldia cerussata
Палеоген	Олигоцен	верхний	Пески и глины с растительными остатками		Угленосные отложения и туфы с Asplenium, Osmunda heeri, Metasequoia disticha	Аргиллиты, песчаники, конгломераты с Solemya dalli, Variamussium pillarense, Psephaea weaveri
		средний				
		нижний	Диатомовые глины и глины с Meretrix incrassata, Miliolina ex gr.selena, Cibicides khanabadensis, Elphidium rischtanicum, Mel.clavigera			Песчаники, алевролиты, конгломераты с Nuculana snatolensis, Nemocardium kovatschensis, Thracia kovatschensis
	Эоцен	верхний	Диатомовые глины и диатомиты с Melosira sulcata, Pyxilla gracilis		Угленосные отложения, эффузивы и туфы с Equisetum arcticum, Juglans juglandiformis, Corylus kenaiana	
		средний	Диатомовые глины и диатомиты с Coscinodiscus uralensis, C. moelleri, Theocosphaera	Глины, пески и алевролиты с Trochodendroides arctica, Nordenskiöldia borealis, Liquidambar europaea		Конгломераты, песчаники, сланцы с Mytilus littoralis, M. yokoyami
		нижний	Опоки и диатомиты с Triceratium fenestratum		Угленосные отложения с Taxites orlikii, Vitis islandica, Quercus platania	Угленосные отложения с Acila aff.decisa, Nuculana gabbi, Scaphander costatus
	Палеоцен		Глины с Cibicides favorabilis		Угленосные отложения, эффузивы и туфы с Trochodendroides smilacifolius, Juglans cf.nigella, Corylus maequarii	
			Глины с Ammobaculites incultus			

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СХЕМА КОРРЕЛЯЦИИ ОТЛОЖЕНИЙ ЧЕТВЕРТИЧНОЙ /АНТРОПОГЕНОВОЙ/ СИСТЕМЫ СОВЕТСКОЙ И ЗАРУБЕЖНОЙ АРКТИКИ

Отделы	Ярусы	Слои	Периоды в тысячах лет до современности /по Н.Н.Лапиной, 1959/	Север Европейской части СССР /бассейн р. Печоры/	Западно-Сибирская и Таймырская низменности	Средне-Сибирское плоскогорье	Приморская низменность /вдоль побережья Восточно-Сибирского моря/	Северо-Восток СССР	Острова Советского сектора Арктики
верхний /голоцен/		послеледниковые	послеледниковый от 0 до 9-10	Аллювий первой террасы и поймы	Аллювий первой террасы и поймы	Аллювий первой террасы и поймы. Делювий склонов	Аллювий первой террасы и поймы. Озерные отложения	Аллювий первой террасы и поймы. Делювий склонов	Морские осадки береговых террас и кос
средний /плейстоцен/	верхний /валдайский/	ледниковые	холодный 9-10 - 20 теплый 20 - 30 холодный 30 - 65	Озерно-аллювиальные позднеледниковые осадки. Ледниковые отложения осташковского и калининского оледенений	Озерные-аллювиальные и долинно-зандровые осадки. Морена и водно-ледниковые отложения покровного зырянского оледенения /2^{x} стадий/	Кары, морены в верховьях долин. Морены и водно-ледниковые отложения зырянского оледенения на плато и верхних террасах	Озерно-аллювиальные отложения с остатками мамонта	Каровые морены. Морены двух стадий горно-долинного зырянского оледенения	Конечные морены на низких террасах. Морские осадки. Озерно-аллювиальные осадки. Морена зырянского оледенения или эрратические валуны
		межледниковые	бореальный /теплый/ 65 - 105	Морские осадки бореальной трансгрессии	Морские осадки бореальной трансгрессии /мессовская, санчуговская, казанская свиты/ цев	Озерные осадки в котловинах, аллювий четвертых террас	Лагунные /?/ осадки	Эрозионный врез в горах. Морские слои вдоль побережья	Морские осадки высоких террас
	средний /днепровский/	ледниковые	холодный > 105	Морены московского и днепровского оледенений /нерасчлененные/	Морена тазовской стадии /р. Турухан/. Межстадиальные слои. Морена самаровской стадии	Остаточные морены максимального оледенения	Слои с Bison priscus longicornis	Эрратические валуны на плато выше 1000 м	Эрратические валуны
		межледниковые		Морские осадки	Аллювий и морские слои погребенных долин	Аллювий пятых речных террас		Излияния лав в Корякском хребте	
	нижний /окский/	ледниковые			Мореноподобные слои в погребенных долинах /р. Ныда/	Аллювий шестых террас. Остатки Elephas wüsti и др.	Слои с остатками горно-таежной флоры /Picea Wollossowiczii и др./	Слои с остатками горно-таежной флоры / Pinus monticola и др./	
		доледниковые			Глинистые осадки с третично-четвертичным комплексом пыльцы				
нижний /эоплейстоцен/						Галечники на водораздельных плато. Эйкская свита /глинистые осадки/. Остатки Elephas meridionalis и др.	Слои с хвойно-широколиственной флорой (Pinus monticola, Juglans cinerea и др.)	слои с хвойно-широколиственной флорой (Tsuga minuta, Juglans cinerea).морские слои с Glycimeris yessonensis и др.	

ОТЛОЖЕНИЙ ЧЕТВЕРТИЧНОЙ /АНТРОПОГЕНОВОЙ/ СИСТЕМЫ
СОВЕТСКОЙ И ЗАРУБЕЖНОЙ АРКТИКИ

Вос- моря/	Северо-Восток СССР	Острова Советского сектора Арктики	Аляска и Кордильеры	Центральная часть Северной Америки		Скандинавия	Возраст по C^{14} в тысячах лет до современности / по R.F.Flint, 1957/	Корреляция с Северными Альпами
ы. я	Аллювий первой террасы и поймы. Делювий склонов	Морские осадки береговых террас и кос	Послеледниковый аллювий	Послеледниковый аллювий		Послеледниковый аллювий и озерные осадки	6,7	голоцен
ные тками	Каровые морены. Морены двух стадий горно-долинного зырянского оледенения	Конечные морены на низких террасах. Морские осадки. Озерно-аллювиальные осадки. Морена зырянского оледенения или эрратические валуны	Каровые морены. Озерно-аллювиальные осадки, Морены двух стадий висконсинского оледенения	Ледниковые отложения висконсинского оледенения	вальдерс манкейто кэри тейзуелл айова пайндейл	сальпаусельке поздний дриас ранний дриас бранденбурские морены	10-11 13 18 40-60	вюрм
дки	Эрозионный врез в горах. Морские слои вдоль побережья	Морские осадки высоких террас	Эрозионный врез, Морские осадки на побережье	Отложения сангамонского межледниковья. Озерные осадки /формация торонто/, торфяники, погребенные почвы		Морские осадки бореальной /еемской/ трансгрессии. Торфяники,		рисс-вюрм
	Эрратические валуны на плато выше 1000 м	Эрратические валуны	Ледниковые отложения /Ном-Ривер, Айрон-крик, Анактувук/, иногда разделяющиеся на два горизонта	Морена иллинойского оледенения, разделенная погребенной почвой на два горизонта				рисс
в	Излияния лав в Корякском хребте		Излияния базальтовых лав	Отложения ярмутского межледниковья. Погребенные почвы и торфяники				миндель-рисс
орно- :ii	Слои с остатками горно-таежной флоры / Pinus monticola и др./			Ледниковые отложения канзасского оледенения /к западу от р.Миссисипи/				миндель
				Отложения афтонского межледниковья				гюнц-миндель
о-	слои с хвойно-широколиственной флорой (Tsuga minuta, Juglans cinerea). морские слои с Glycimeris yessonensis и др.			Ледниковые отложения небрасского оледенения				гюнц

TABLE 2 (continued)

System	Division	Stage	Basin of the river Aldan	Eastern Verkhoyansk region	Okhotsk shore	Basins of the rivers Yana and Indigirka.	Basin of the river Kolyma (upper course)	Okhotsk-Kolyma water divide.	Basins of the rivers Zyryanka and Uzhogina	Alazeysky plateau
JURASSIC	LOWER JURASSIC UPPER LIASSIC	TOARCIAN	Hastites 260	Siltstones and schists with Dactilioceras 200-500	Tuffs and magmas of andesite with Variamussium, Eumorphotis, Hastites with Angeloteuthis 1500-1600	Mersky formation of sandstones with Cuspiteuthis 1350	Strata with Hastites, Nanobelus	Schists with Pseudolioceras, Hastites		Khairdakh formation - tuffs or basik and acid effusives with Cuspiteuthis with Posidonia, Passaloteuthis 1300-1400
	MIDDLE LIASSIC	PLIENSBACHIAN DOMERIAN	Sandstones & schists with Harpax, Pseudomonotis, Amaltheus 150	Schists and sandstones with Amaltheus, Velopecten 350			Seymchansky formation of tufaceous sandstones and schists	Schists and tuffs with Amaltheus margaritatus with Uptonia jamesoni		
	LOWER LIASSIC		Ukugutsky formation with the flora of Rhaetian Liassic type	Sandstones and schists with lenses of conglomerate	Schists and tuffs with Crenatual olifex Pseudomonotis 400	Schists and sandstones with Pseudomonotis, Schlotheimia 650-700	With Amaltheus margaritatus 1000	Argillaceous schists with tuffs With Arietites, with Schlotheimia, Psiloceras		Natpyy formation-effusives of spilites 1100-1200
TRIASSIC	Upper				Asatkansky formation of ashen tuffs with fauna of the Rhaetian type	Sandstones and schists of the Rhaetian type		Strata with Rhaetian fauna		

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Table 2. Page 1[illegible].

[illegible] North-East of the USSR.

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System	Division	Stage	Basin of the river Aldan	Eastern Verkhoyansk region	Okhotsk shore	Basins of Yana and Indigirka rivers	Basin of the river Kolyma (upper course).	Okhotsk - Kolyma water divide	Basins of the rivers Zyryanka and Okhogina	Alazeysky plateau
Chalk	Lower Chalk	Albian Aptian Barremian Hauterive Valangin	Sangarsky coal-bearing formation characterized by the flora of the Lower Chalk - 900		Sandstone-conglomerate formation ---unconformity----- Khasynsky coal-bearing formation with Pseudestheria		----unconformity------ Malinovsky coal-bearing formation with Estheria and plants 500-700	Sedimentary-volcanogenous rocks ---- unconformity -------- Coal-bearing deposits with plants and Estheria	Silyapsky coal-bearing formation 3000-5000 Zyryansky formation with plants of the Lower Chalk with Cucullaea 1700-1900	
Jurassic	Upper Jurassic	Upper-Volga Lower-Volga Kimeridgian	Chechumsky formation Sytoginsky sub-formation with Aucella, Pachyteuthis & Cylindroteuthis - 50		Palatinsky formation of spilitic effusions and their tuffs with Pseudestheria 650 Uptarsky formation with Taeniopteris & Loxomicroglypta - 800 Tauysky formation of andesites and their tuffs with Equisetum- 1200.	Chibagalakhsky formation of schists and quartz porphyries. with Aucella and Cylindroteuthis	Lyglykhtakhsky formation with Aucella fischeriana 400-500 Taskansky formation with A mosquensis, A. bronni, Cardioceras 1100	Kad'kutsky formation with Estheria, with Modiola, Pleuromya, Aucella 800	Bocharsky formation with Aucella mosquensis, A. bronni 250	Oyunsky formation of sedimentary-volcanogenous rocks. With Aucella russiensis, A. orbicularis with A. bronni 1300
	Middle Jurassic	Oxfordian Callovian	Dzhyaskoysky coal-bearing sub-formation 410-450	Sandstones with intercalations of coal	Liparite-dacite series of rocks with streaks of coal (Kharbiz formation) 400-500	In'yalinsky formation of sedimentary-volcanogenic rocks	Verinsky formation of sedimentary-volcanogenous rocks 450	Viliginsky formation of sandstones with Perna, Pseudomonotis umaltensis 1000-1200	Argatassky effusive-tuffaceous formation with Cadoceras 750	Strata with Pleuromya, Bureiamya, Pseudomonotis 1200
		Bathonian Bajocian Aalen	Sudzhinsky formation	Sandstones and schists with Eumorphotis, Inoceramus, Hastites 500-1000	Umarinsky formation of schists & tuffs with Cylindroteuthis; Inoceramus; Dolcobelus; Mesoteuthis rhenana 700	Ol'chansky formation with Inoceramus retrorsus 1400-2000	Schists and sandstones with Arctocephalites, Inoceramus Hastites 800-1000	with Arcticoceras, Inoceramus, Eumorphotis, lenaensis, with Ludwigia, Hastites 1200	Paleozoic (Lower and Middle)	Alaceysky tufaceous formation with Cranocephalites, Inoceramus 500 Ikkikyunakh formation of sedimentary-volcanogenous rocks 1100-1500

TABLE 1.

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(width in meters).

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DIVISION	STAGE	HORIZON	Eastern Verkhoyansk region	Okhotsk shore	Basins of Yana and Indigirka rivers	Upper course of Kolyma river	Central and Eastern areas of Kolyma river.	Paleozoic ridges of Chersky Mountains.
Upper Trias	Rhaetian		Sandstones, siltstones and schists with lenses of conglomerates Neocalamites	Ashen tuffs with Megalodon, Tancredia dittmari, Oxytoma, Pecten 1000	Siltstones and sandstones with Megalodon, Nucula, Myophoria 900-1000	Schists, sandstones, and greywackes with Rhynchonella, Oxytoma 700-1500	Schists and siltstones with intercalations of tuffs containing Athyris, Zeilleria austriaca, Megalodon, Lima subdupla 750-900	Sandstones and schists with remainders of plants and Pseudomonotis 400-500
	Noric	Upper	With Dentalium 800	Schists and sandstones with Pseudomonotis ochotica with Pseudomonotis scutiformis 250-300 Andesito-basalts & their tuffs with Neocalamites	Mainly sandstones with Pseudomonotis ochotica 650-800	sandstones and schists with Pseudomonotis ochotica 500-600	Sedimentary-volcanogenous formations With Pseudomonotis ochotica 550-900	Calcareous schists and limestones with Pseudomonotis ochotica.
		Lower			Schists and siltstones with Pseudomonotis scutiformis 500-900	Mainly schists with Pseudomonotis scutiformis 150-300	With Pseudomonotis scutiformis, Halobia salinarum 150-200	With Pseudomonotis scutiformis, Ostrea, Gryphaea 200-250
	Carnian	Upper	Sandstone-schistous rocks with Oxytoma, Halobia superba, Cardinia 900-1000	Calcareous schists & siltstones with Oxytoma, Halobia	Sandstones and schists with Cardinia, Oxytoma, Halobia 300-700	Schists and siltstones with Cardinia, Halobia, Pecten subhiemalis 150-400	Schists with Omolonella, Oxytoma, Halobia, Gryphaea, Pleurophorus 250	Schists and calcareous limestones With Rhynchonella, Cardinia, Halobia 100
		Lower		With Nucula, Halobia, zitteli, Sirenites hayesi 100-600	Argillaceous schists with Halobia superba, Sirenites senticosus, Clionites, Arcestes 800-1300	Schists with Trigonodus, Nucula, Halobia, Clionites, Sirenites 500-1200	Schists with Halobia, Sirenites hayesi, S. striatofalcatus, Clionites, Trachyceras 700-1000	With Halobia zitteli, Discophyllites Sirenites 200 Tuffs and tufaceous sandstones 20-50
Middle Triassic Ladinian			Sandstones with intercalations of siltstones, schists and conglomerates	Upper Permian	Siltstones with Daonella, Indigirites	Siltstones with Spiriferina aff. kaihikuana, Monophyllites	Schists and siltstones with Daonella, Monophyllites	Paleozoic Argillaceous limestones with Indigirites

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Корреляционная таблица отложений юрской системы в Советской и зарубежной Арктике

Отдел	Ярус	Зона	Район Баренцева моря (в границах СССР)	Север Западно-Сибирской низменности	Енисейско-Ленский прогиб	Приверхоянский прогиб	Верхояно-Чукотская область	Анадырско-Ко облас
Верхний (J_3)	Верхний волжский Vlg_2		Песчаники с Craspedites cf.fragilis	Глины и алевролиты с Craspedites okensis, Cr.aff. fragilis, Cr.cf.leptus, Kashpurites	Глины с Craspedites okensis, Taimyroceras, Perisphinctidae, Aucella fischeriana	?	Песчаники с Aucella fischeriana, A.russiensis	Песчаники, а и аргиллиты Aucella fisc
	Нижний волжский Vlg_1	Virgatites virgatus и Epivirgatites nikitini	Сланцы с Virgatites virgatus	Глины и алевролиты с Laugeites stschurovskii	Глины с Laugeites ?, Aucella russiensis			?
				с Pavlovia ? vogulica				
		Dorsoplanites dorsoplanus	Глины с Dorsoplanites panderi, D.dorsoplanus	с Behemoth sp.	Глины с Dorsoplanites aff. panderi, D.dorsoplanus, D.cf. triplex, Aucella mosquensis, A.gabbi	Глины с Dorsoplanites sp., Aucella mosquensis	Песчаники, сланцы и туфы с Aucella mosquensis, A.orbicularis	
				с Dorsoplanites spp.				
				с Dorsoplanites kurbskyi				
				с Pavlovia strajevskyi				Песчаники, сл фы с Subpla cf.sokolovi, mosquensis
		Subplanites	?	с Pavlovia jatriensis и Pectinatites	Глины и алевролиты с Pectinatites, Subplanites roter	Глины с Aucella lindstroemi, Pachyteuthis excentrica.		
				с Subdichotomoceras и Subplanites				
	Кимеридж (Km)	?	Песчаники с Amoeboceras subtilicostatum	Глины с Aulacostephanus eudoxus, Amoeboceras sultibicostatum	Глины и алевролиты с Amoeboceras decipiens		Сланцы и песчаники с Amoeboceras sp., Perisphinites sp.	
		Amoeboceras decipiens	Алевролиты с Amoeboceras decipiens, A.bodylevskii	Глины с Aulacostephanus yo	Глины и алевролиты с Amoeboceras kochi, A.sokolovi			
		Amoeboceras kitchini	Алевролиты с Amoeboceras kitchini, A.spathi	Глины с Rasenia uralensis, Amoeboceras kitchini	Глины и глауконитовые песчаники с Amoeboceras kitchini, Rasenia			
				Глины с Pictonia evoluta				
				Глины с Prorasenia sp.				
	Оксфорд верхний (Oxf_2)	Amoeboceras alternans	Песчаники и алевролиты с Amoeboceras alternans	Глины с Ringsteadia	Глины и глауконитовые песчаники с Amoeboceras alternans		Слои с Amoeboceras alternans	
				Глины с Amoeboceras alternans	Глины и алевролиты с Amoeboceras alternoides			
	Оксфорд нижний (Oxf_1)	Cardioceras cordatum	Глины с Cardioceras anabarense	Глины с Cardioceras kostromense, C.cf.cordatum	Глины с Cardioceras cordatum, C.excavatum v.arctica	Алевролиты с Cardioceras Cl.excavatum v.arctica, C.anabarense	Слои с Cardioceras cordatum	Песчаники и с Aucella tenui Cylindroteuth obelisca
Средний (J_2)	Келловей верхний (Cl_3)	Longaeviceras keyserlini	Глины с Longaeviceras ex gr. nikitini	Глины с Longaeviceras	Глины с Longaeviceras nikitini, L.novosemelicum	Алевролиты с Longaeviceras	Песчаники и туфы с Cardioceras sp.	
	Келловей средний (Cl_2)	Cadoceras milaschevici	Глины с Cadoceras tschefkini	Глины и песчаники с Cosmoceras	Глины с Cadoceras milaschevići, C.tschefkini	Алевролиты с Cadoceras tschefkini, C.milaschevići		
	Келловей нижний (Cl_1)	Cadoceras elatmae	Глины с Cadoceras elatmae	Глины и песчаники с Macrocephalites	Глины с Cadoceras elatmae	Алевролиты с Cadoceras elatmae		
			Глины с Cadoceras ognevi		Глины и алевролиты с Cadoceras ognevi			
		Arcticoceras ishmae	Глины с Arcticoceras ishmae		Глины и алевролиты с Arcticoceras	Песчаники и алевролиты с Arcticoceras ishmae	Слои с Arcticoceras ishmae	
	Бат верхний (Bt_2)		Глины с Arctocephalites arcticus		Алевролиты с Arctocephalites	Аргиллиты и алевролиты с Arctocephalites aff. ellipticus	Песчаники и сланцы с Arctocephalites arcticus, Inoceramus porrectus, Megateuthis	
	Бат нижний (Bt_1)		Песчаники с Cranocephalites pompeckji		Глины и алевролиты с Cranocephalites, Morrisiceras, Megateuthis	Глины и алевролиты с Cranocephalites		
	Байос (Bj)		Алевролиты и глины без фауны	Угленосные отложения с Sphenobaiera, Cladophlebis cf.nebbensis, Coniopteris nymenophylloides, C.maakiana, Equisetites	Глины и алевролиты с Pseudomonotis decussata, Arctotis sublaevis	Алевролиты и песчаники с Hyperlioceras, Inoceramus ex gr.lucifer	Сланцы и песчаники с Holcobelus blainvillei, Inoceramus lucifer	Аргиллиты с Inoceramus ex retrorsus
	Аален верхний (Al_2)		Алевролиты с Ludwigia cf. murchisonae, Oxytoma jacksoni		Песчано-глинистые породы с Ludwigia concava, Arctotis lenaensis	Глины с Ludwigia concava	Сланцы и песчаники с Ludwigia concava, Mesoteuthis rhenana	Песчаники и а ты с Mytilo amygdaloides, mus ecorochod
	Аален нижний (Al_1)				Слои с Pseudolioceras sp. (cf.beyrichi ?)	Алевролиты с Pseudolioceras beyrichi		
Нижний (J_1)	Тоар (Tr)		—		Алевролиты и песчаники с Pseudolioceras sp., Nannobelus, Passaloteuthis tolli	Алевролиты и глины с Dactylioceras gracile, Leda acuminata	Сланцы и алевролиты с Pseudolioceras compactile, Cuspiteuthis tabularis	Песчаники, алев и туфы с Pseud compactile, P biense, Pseudo substriata
					Глины и алевролиты с Dactylioceras aff.annulatum, D.mucronatum		Сланцы и алевролиты с Dactylioceras athleticum, Pseudolioceras whitbiense	
	Домер (Dm)			Угленосные отложения с Cladophlebis haiburnensis, Cl.cf.denticulata, Neocalamites, Schizoneura	Глины, алевролиты и конгломераты с Amaltheus margaritatus, Harpax, Myophoria laevigata	Алевролиты и конгломераты с Amaltheus margaritatus, Harpax, Myophoria laevigata	Сланцы и песчаники с Amaltheus margaritatus, Harpoceras elegans, Harpax	
	Плинсбах (Pl)				? Песчаники и конгломераты с Harpax	Песчаники и конгломераты с растительными остатками	Сланцы и туфы с Uptonia jamesoni, Pseudoamaltheus laevis, Harpax	Песчаники с Spiriferina, Pentacrinus j P.cf.subangul
	Лотарингский (Lt)		Песчаники с прослоями конгломератов и алевролитов с растительными остатками		? Песчаники и конгломераты с Pseudomonotis lisabeti		Сланцы и туфы с Arietites siverti, Pentacrinus, briareus, Pseudomonotis originalis	
	Синемюрский (Snm)							
	Геттангский (Htn)						Сланцы и туфы с Psiloceras, Schlotheimia, Pseudomonotis originalis	

рогиб	Верхояно-Чукотская область	Анадырско-Корякская область	Аляска	Северная Канада	Гренландия	Шпицберген
	Песчаники с Aucella fischeriana, A.russiensis	Песчаники, алевролиты и аргиллиты с Aucella fischeriana	?		Песчаники с Craspedites leptus, Cr.ferrugineus, Perisphinctidae	?
				? Слои с Dorsoplanites sp.ind., Camptonectes praecinctus	Песчаники с Dorsoplanites gracilis, Laugeites	
nites sp.,	Песчаники, сланцы и туфы с Aucella mosquensis, A.orbicularis	?			Глауконитовые песчаники и глины с Pavlovia	
			Сланцы с Aucella mosquensis, A.rugosa, A.piochii			
		Песчаники, сланцы и туфы с Subplanites cf.sokolovi, Aucella mosquensis		Сланцы с Aucella mosquensis, A.rugosa	Глины и алевриты с Pavlovia, Dorsoplanites, Pectinatites	Сланцы и песчаники с Dorsoplanites aff.panderi
lindstrer excentrica.					Сланцы с Sphinctoceras, Subplanites	
					Сланцы с Amoeboceras decipiens	
	Сланцы и песчаники с Amoeboceras sp., Perisphinites sp.				Сланцы с Amoeboceras kochi, A.sokolovi	Слои с Amoeboceras sokolevi
			Сланцы и песчаники с Amoeboceras, Aucella spitiensis, A. concentrica, A.brenni		Сланцы с Rasenia borealis	
				Слои с Amoeboceras sp.ind., Rasenia ?	Сланцы с Rasenia orbignyi, Amoeboceras	Сланцы с Amoeboceras kitchini, Rasenia
	Слои с Amoeboceras alternans				Песчаники с Amoeboceras aff.alternoides, A.cf.alternans	Сланцы с Amoeboceras alternoides
					[illegible] Ringsteadia	
ioceras	Слои с Cardieceras cordatum	Песчаники и сланцы с Aucella tenuistriata, Cylindroteuthis cf. obelisca	Слои с Cardioceras sp.	Слои с Cardioceras aff.mirum	Сланцы с Cardioceras caelatum	?
gaeviceras	Песчаники и туфы с Cardieceras sp.		Сланцы с Kosmoceras castor			Слои с Longaeviceras, Quenstedticeras
ceras scheviči			Сланцы с Pseudocadoceras grewingki, Reineckeia cf. stuebeli	—	—	?
ceras t				Сланцы с Cadoceras, Kepplerites	Сланцы с Kepplerites tychonis, Cadoceras calyx	Сланцы и песчаники с Cadoceras и Kepplerites
литы с ue	Слои с Arcticeceras ishmae		Сланцы с Arcticeceras sp.	Сланцы с Arcticeceras	Сланцы и песчаники с Arcticoceras	
олиты с ff.	Песчаники и сланцы с Arctecephalites arcticus, Ineceramus perrectus, Megateuthis		Слои с Arctecephalites	Песчаники с Cranocephalites vulgaris, Arctocephalites	Сланцы и песчаники с Arctecephalites	Песчаники и глины с Arctecephalites arcticus
ы с			Слои с Reineckeia, Cranocephalites		Сланцы и песчаники с Cranocephalites pompeckji	
аники с oceramus	Сланцы и песчаники с Halcebelus blainvillei, Ineceramus lucifer	Аргиллиты с Inoceramus ex gr. retrorsus	Слои с Sphaeroceras	? Песчаники с Arcelloceras, Inoceramus lucifer		
			Слои с Normannites			
			Слои с Stephanoceras	Слои с Stephanoceras ?		—
a concava	Сланцы и песчаники с Ludwigia concava, Mesoteuthis rhenana	Песчаники и алевролиты с Mytileides cf. amygdaleides, Inoceramus scorochodi	—	—	—	
udelio-			Сланцы с Pseudolieceras whiteavesi, Tmeteceras, Eryoites	Алевролиты с Leioceras opalinum, Pseudolieceras m'clintocki		
ины с cile,	Сланцы и алевролиты с Pseudolieceras compactila, Cuspiteuthis tabularis	Песчаники, алевролиты и туфы с Pseudolioceras compactile, Ps.cf.whitbiense, Pseudomonotis substriata	Сланцы с Pseudolioceras cf. compactile, Ps.cf.lythense	Слои с Pseudolioceras aff. compactile, Harpoceras cf. exaratum	Песчаники с Pseudolioceras compactile	Фосфоритовые конгломераты с Pseudolioceras compactile, Dactylioceras annuliferum
	Сланцы и алевролиты с Dactylioceras athleticum, Pseudolioceras whitbiense		Сланцы с Dactylioceras	Слои с Dactylioceras commune	Песчаники и конгломераты с Dactylioceras groenlandicum, Catacoeloceras	
гломераты с itatus, laevigata	Сланцы и песчаники с Amaltheus margaritatus, Harpoceras elegans, Harpax		Сланцы с Amaltheus cf.engelhardti, Lytoceras cf.fimbriatum	Слои с Amaltheus margaritatus, Predactylioceras	? Песчаники, сланцы, конгломераты с Gervillia	
	Сланцы и туфы с Uptonia jamesoni, Pseudoamaltheus laevis, Harpax			—	Известняки с Beaniceras, Lytoceras fimbriatum	
ломераты с татками					Известняки с Uptonia jamesoni	
	Сланцы и туфы с Arietites siverti, Pentacrinus, briareus, Pseudomonotis originalis	Песчаники с Spiriferina, Oxytoma, Pentacrinus juensis, P.cf.subangulatis	Слои с Arietites cf. bucklandi	Слои с Echioceras, Oxynoticeras, Arctoasteroceras		—
				Слои с Arnioceras sp.	? Слои с Gryphaea arcuata	
	Сланцы и туфы с Psiloceras, Schlotheimia, Pseudomonotis originalis			Слои с "Psiloceras"	Песчаники с Thaumatopteris	

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CORRELATION TABLE OF THE QUATERNARY (ANTHROPOGENE) FORMATIONS OF THE SOVIET AND FOREIGN ARCTIC

Series	Stages	formations	Time intervals in t y till today by N.N.Lapina	North of the European part of the USSR (Pechora basin)	West-Siberian and Taimyr plains	Central-Siberian plateau	Coastal plains along the stretch of the Laptew, East-Siberian and Chukchi sea coasts	North-East of the USSR	Islands of the Soviet Arctic	Alaska and Cord
Upper (Hologene)		post-glacial	Recent 0 down to 9-10	Alluvium of the first-level terrace and flood plain	Alluvium of the first-level terrace and flood plain	Alluvium of the first-level terrace and flood plain *Scree covering the slopes*	Alluvium of the first-level terrace and flood plain. Lacustrine sediments	Alluvium of the first-level terrace and flood plain . Scree covering the slopes	Marine deposits along the stretch of the coast	Recent alluviu
Middle (Pleistocene)	Upper (Valdai)	glacial	cold 9 10 till 20 warm 20 till 30 cold 30 till 65	Fluviolacustrine lateglacial deposits. The Ostashkow and Kalinin drift.	Fluviolacustrine and sand deposits. Moraine and fluvioglacial deposits of the Zyryanka sheet glaciation (two substages)	Kars; moraines of the upper parts of the valleys. Morains and fluvioglacial deposits of the Zyryanka glaciation on plateaus and highest terraces	Fluviolacustrine deposits containing the mammoth remains	Moraines in the kars. Moraines (two substages) of the valley-mountain glaciation	End moraines on the lowest terrace. Marine deposits. Lacustrine deposits. Zyryanka drift or erraties.	Moraines in the Fluviolacustrine Moraines (two su of the Visconsin ation
		inter-glacial	warm (boreal) 65 till 105	Marine deposits of the Boreal transgression	Marine deposits of the Boreal transgression (Messo-river, Sanchugovka-river and Kazantseva-river members)	Lacustrine deposits in troughs. Alluvium of the fourth-level terrace	Lagoonal (?) deposits	Erosional cut. Marine beds along the stretch of coast	Marine deposits of the highest terrace.	Erosional cut. Marine deposits stretch of the c
	Middle (Dnieper)	glacial	cold >105 ago	Moscow and Dnieper drift ~~(undivided) not subdivided~~	Moraines of the Taz substage (at the Turukhan river). Interstadial beds. Moraine of the Samarovo substage.	Erratics and moraines of the Maximum Glaciation		Erratics on the plateau heigher than 1000m	Erratics	The Nome-river, creek and other somewhere divide two substages
		inter-glacial			*Alluvium and marine beds in the buried valleys*	Alluvium of the fifth-level terrace	Beds with Bison priscus longicornis	Eruptions lava in the Koryak-range		Basaltic lava er
	Lower (Oka)	glacial			Moraine-like beds in the buried valleys (the Nyda river)	Alluvium of the sixth-level terrace. Fossil mammals (Elephas wüsti)	Beds with the taiga-mountain fossil plants (Picea Wollowowiczii and oth.)	Beds with the taiga-mountain fossil plants (Pinus monticola and oth.)		
		inter-glacial			Clay deposits with the Tr-Q spore-complex					
Lower (Eopleistocene)						Pebble and clay deposits on the watershed plateau. Fossil mammals (Elephas meridionalis).	Beds with the coniferous-broadleaved flora (Pinus minticola, Juglans cinerea and oth.)	Beds with the coniferous-broadleaved flora (Tsuga minuta, Juglans cinerea). Marine beds with Glycimeris yessonensis and oth.		

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E OF THE QUATERNARY (ANTHROPOGENE) FORMATIONS OF THE SOVIET AND FOREIGN ARCTIC

al plains the stretch e Laptew, East- ian and Chuk- i sea coasts	North-East of the USSR	Islands of the Soviet Arctic	Alaska and Cordilljera	Central part of North America	Scandinavia	Age on C^{14} in t y till today, by R.Flint, 1957	Correlation with the Northern Alps
ium of the -level ce and flood . trine sediments	Alluvium of the first-level terrace and flood plain . Scree covering the slopes	Marine deposits along the stretch of the coast	Recent alluvium	Recent alluvium	Recent alluvium Lacustrine deposits	> 6,7	Holocene
olacustrine its containing ammoth remains	Moraines in the kars. Moraines (two substages) of the valley-mountain glaciation	End moraines on the lowest terrace. Marine deposits. Lacustrine deposits. Zyryanka drift or erraties.	Moraines in the Kars. Fluviolacustrine deposits. Moraines (two substages) of the Visconsin glaciation	Visconsin drift Valders Mankato Carry Tazewell Jowa Pinedale	Salpauselkä Late Dryas Early Dryas Brandenburg	1o-11 13 >18 40-60	Würm late main early
onal (?) de- posits	Erosional cut. Marine beds along the stretch of coast	Marine deposits of the highest terrace.	Erosional cut. Marine deposits along the stretch of the coast	Sangamon interglacial deposits: lacustrine deposits (Toronto formation), peats, buried soils	Marine deposits of the Boreal (Eemian) transgression. Peats.		Riss-Würm
	Erratics on the plateau heigher than 1000m	Erratics	The Nome-river, the Iron-creek and other drift somewhere divided into two substages	Illinoian drift, divided into two substages by the buried soil			Riss
with Bison cus longicor-	Eruptions lava in the Koryak-range		Basaltic lava eruption	Yarmouth interglacial deposits. Buried soil. Peats			Mindel-Riss
with the a-mountain l plants a Wollowo- i and oth.)	Beds with the taiga-mountain fossil plants (Pinus monticola and oth.)			Kansan drift (west from Mississippi river)			Mindel
				Aftonian interglacial deposits			Güz-Mindel
ith the coni- -broadleaved (Pinus minti- Juglans cine- d oth.)	Beds with the coniferous-broad-leaved flora (Tsuga minuta, Juglans cinerea). Marine beds with Glycimeris yessonensis and oth.			Nebraskan drift			Günz

CORRELATION CHART OF THE CRETACEOUS FORMA

Series	Stage	Zone	Barents Sea region (within the limits of the USSR)	North of the West-Siberian plain	Lena-Yenisei depression	Verkhoyansk foredeep
Upper (Cr$_2$)	Danian (Dn)			Clay with Anomalina praeacuta, Globigerina varianta.	—	Sand with Asplenium, Trochodendroides, Populus, Zizyphus, Platanus
	Maestrichtian (Mst)		—	Clay and marl with Baculites vertebralis, B.sibiricus, Gaudriceras pygmaeum	Sand with Baculites anceps v.leopolinsis, Tancredia americana	
	Campanian (Cmp)			Clay and gaize with Baculites cf. obtusus, Scaphites cuvieri	Clay and siltstone with Inoceramus sp.	
	Upper Santonian (Snt$_2$)		Sandstone and clay with Inoceramus patootensis, Oxytoma tenuicostata	Clay and gaize with Inoceramus steenstrupi, Oxytoma tenuicostata	Clay and siltstone with Inoceramus patootensis, In.steenstrupi, Oxytoma tenuicostata	Sand and sandstone with Trochodendroides, Macclintockia, Creineria, Protophyllum, Viburnum, Nordenskioldia borealis
	Lower Santonian (Snt$_1$)			Clay and gaize with Actinocamax ex gr.verus, A.cf.propinquus	Siltstone with Inoceramus pachti	
	Coniacian (Cn)			Clay and gaize with Inoceramus cf.anomalis	Siltstone and sandstone with Inoceramus subinvolutus, In.russiensis, In.sachs	
	Upper Turonian (Tur$_2$)			Clay with Baculites romanovskii, Gaudryina filiformis	Siltstone with Inoceramus lamarcki, In. interruptus, In.inaequivalvis, Borissjakoceras	
	Lower Turonian (Tur$_1$)			Clay with Inoceramus cf.labiatus, Gaudryina filiformis	Clay with Placenticeras cf.planum, Inoceramus cf.labiatus, Gaudryina cf.filiformis	Sand and sandstone with Menispermites, Sassafras, Dalbergites, Cissites, Sterculia
	Cenomanian (Cm)		Sandstone and siltstone with Schloenbachia varians, Schl.aff.subvarians, Oxytoma pectinata	Siltstone with Entolium ex gr. balticus, Inoceramus aff.amudariensis, Verneuilina asanoviensis	Sand and sandstone with Podocarpoxylon gothani	
	Upper Albian (Alb$_3$)		?	Clay and siltstone with Cleoniceras cf.bicurvatoides, Inoceramus anglicus, Ammobaculites agglutinans, Verneuilina praeasanoviensis, Milliammina rasilis	Coal-bearing deposits with Verneuilina praeasanoviensis, Milliammina rasilis, Ginkgo aff.pseudoadiantoides major, Sequoia sp.	Coal-bearing deposits with Asplenium aff. dicksonianum, Coniopteris adiantoides
	Middle Albian (Alb$_2$)					
	Lower Albian (Alb$_1$)		Sandstone with Cleoniceras, Balduroceras ?			
Lower (Cr$_1$)	Aptian (Apt)		Sandstone with Deshayesites	Clay, siltstone and sandstone with Mansisaurus sp.	Coal-bearing deposits with Ginkgo huttonii, Phoenicopsis angustifolia	Coal-bearing deposits with Sphaenobaiera, Podozamites, Jacutiella amurensis
	Barremian (Br)		Basalt, tuff and sandstone with Cladophlebis rigida, Podozamites graminens, Pityophyllum staratschini	Claystone and siltstone with Sphenopteris cf.fittonii, Podozamites lanceolatus		
	Upper Hauterivian (Ht$_2$)		Sandstone and clay with Simbirskites	Clay, siltstone and sandstone with Speetoniceras, Aulacoteuthis cf. absolutiformis, Cylindroteuthis necopinus	Coal-bearing deposits with Coniopteris nympharum, Podozamites eichwaldii, Corbula cf.sowerbyi, C.cf. sedgwickii	Coal-bearing deposits with Cladophlebis lenaensis, Cl.williamsonii, Corbula cf.sedgwickii, C. cf.sowerbyi
	Lower Hauterivian (Ht$_1$)		Sandstone with Cyrena cf.uvatica, C.cf.venulina	Sandstone, claystone and clay with Lingula	? Sandstone and siltstone with Polyptychites, Aucella sublaevis, Cylindroteuthis pachsensis	
	Upper Valanginian	Dichotomites bidichotomus	Clay with Dichotomites, Polyptychites polyptychus	Clay with Dichotomites ex gr. polytomus, Neocraspedites liapinensis	Clay and siltstone with Dichotomites, Neocraspedites, Bochianites demissus	Sandstone with flora remnants
	Middle Valanginian	Astieriptychites astieriptychus	Sandstone with Euryptychites gravesiformis, Temnoptychites hoplitoides	Clay with Polyptychites aff.keyserlingi	Clay and siltstone with Astieriptychites, Polyptychites ramulicosta, Euryptychites	Sandstone, siltstone, claystone with Astieriptychites, Euryptychites, Polyptychites
		Temnoptychites syzranicus		Clay with Temnoptychites triptychiformis	Clay and siltstone with Temnoptychites, Euryptychites, Polyptychites aff.keyserlingi	
	Lower Valanginian	Tollia tolli	Sandstone with Tollia cf. stenomphala	Clay with Tollia stenomphala, T. sibirica, T.anabarensis, Aucella inflata	Clay and siltstone with Tollia, Acroteuthis lateralis, Aucella crassa	Sandstone and siltstone with Tollia, Aucella inflata
		Paracraspedites spasskensis	Sanstone and clay with Paracraspedites spasskensis	Clay with Paracraspedites, Subcraspedites, Garniericeras tolliense, Aucella volgensis	Clay, siltstone and sandstone with Paracraspedites, Subcraspedites, Aucella volgensis	Clay and sandstone with Paracraspedites, Aucella volgensis

FORMATIONS IN THE SOVIET AND THE FOREIGN ARCTIC

Verkhoyansk-Chukchi area	Anadyr-Koryak area	Alaska	Northern Canada	Greenland	Svalbard
	Coal-bearing deposits with Trochodendroides, Magnolia, Quercus, Viburnum, Asplenium		Coal-bearing deposits, lava		
	Sandstone, siltstone, tuff with Pachydiscus neubergicus, Brahmaites				
Coal-bearing deposits, lava, tuff with Trochodendroides, Cephalotaxopsis, Sequoia, [illegible]	Sandstone, conglomerate, tuff with Eupachydiscus sp., Inoceramus cf. balticus			Shale with Acanthoscaphites quadrangularis, A.greenlandicus	
	Claystone and tuff with Inoceramus patootensis, Anapachydiscus naumanni, Eupachydiscus cf.levyi	Beds with Parapuzosia, Pachydiscus		Shale and sandstone with Inoceramus patootensis, In. steenstrupi, Oxytoma tenuicostata	
	Claystone and tuff with Inoceramus cardissoides	Siltstone and tuffite with Inoceramus aff.cardissoides		Sandstone and shale with Inoceramus ex gr.cardissoides	
	Sandstone, claystone, tuff with Kossmaticeras, Inoceramus ex gr.lamarcki	Beds with Inoceramus vancouverensis	Shale	Shale with Scaphites ventricosus	
		Shale and sandstone with Inoceramus cuvieri, In. lamarcki, In.subalatus			
Coal-bearing deposits, lava and tuff with Cladopalebis frigida, Ginkgo adiantoides, Sequoia obowata, Quereuxia, Thaja, Viburnum		Shale and sandstone with Scaphites delicatulus, Inoceramus labiatus, Borissjakoceras	Sandstone and shale containing coal seams with Scaphites, Watinoceras, Inoceramus labiatus	Sandstone with Scaphites aff.lamberti, Prionotropis cf.woolgari, Borissjakoceras, Inoceramus lamarcki	
	Sandstone, claystone, tuff with Tetragonites, Turrilites costatus, Inoceramus concentricus v. nipponicus	Sandstone and siltstone with Inoceramus athabaskensis	Shale and sandstone with Beudanticeras, Gastroplites, Hoplites	Shale and sandstone with Schloenbachia, Gaudryceras, Inoceramus crippsi, In. pictus	
				Shale and sandstone with Inoceramus anglicus, Aucellina caucasica	
Coal-bearing deposits, lava and tuff with Coniopteris onychioides, Ginkgo adiantoides, Sassafras kolymensis	Sandstone, claystone, limestone and tuff with Sonneratia, Sanderioceras, Cleoniceras, Stolizkaia, Beudanticeras, Inoceramus anglicus	Shale and sandstone with Cleoniceras, Lemuroceras, Gastroplites, Aucellina, Inoceramus anglicus		Sandstone and shale with Hoplites, Dimorphoplites, Euhoplites. Gastroplites	Sandstone with Arcthoplites cf.jachromensis
			Sandstone and shale	Sandstone and shale with Arcthoplites cf.jachromensis, Beudanticeras cf.hulenense	
	Sandstone, claystone and tuff with Aucellina aptiensis		Sandstone	Shale with Sanmartinoceras	Shale with Crioceras arcticum, Cr.gracile, Aucellina aff.caucasica, Inoceramus spitzbergensis
				Sandstone with Deshayesites, Ancyloceras aff.matheronianum	
			Shale with Crioceras cf.remondi, Aconeceras, Acroteuthis, Aucellina		Coal-bearing deposits with Ginkgo digitata
					Coal-bearing deposits with Pityophyllum lindströmi
Sandstone with Simbirskites			Shale with Oxyteuthis jasikowi, Ox.pugio v. rimata		Coal-bearing deposits with Lioplax polaris
					Coal-bearing deposits with Elatides curvifolia
?Shale with Aucella sublaevis	? Shale with Aucella sublaevis	? Shale with Aucella sublaevis	?Sandstone with Aucella	? Red sandstone with Lyticoceras, Aucella	? Sandstone with Pecten ex gr.spitzbergensis
			Sandstone and silty clay with Aucella crassicollis	Limestone, sandstone, shale, gravelite with Polyptychites, Neocraspedites	Shale with Dichotomites beani, Aucella sublaevis
Shale and sandstone with Aucella keyserlingi, A. crassicollis, A.sublaevis, A.crassa	Shale, siltstone, sandstone, tuff with Aucella inflata, A.keyserlingi, A. ex gr.sublaevis, A.crassicollis	A.crassicollis, A.crassa	Sandstone and silty clay with Euryptychites aff. latissimus, E.globulosus	Limestone, sandstone, shale, gravelite with Polyptychites, Euryptychites	Shale with Polyptychites quadrifidus
				Shale with Tollia payeri	
Shale and sandstone with Aucella volgensis, A. terabratuloides	Shale, siltstone, sandstone and tuff with Aucella lahuseni, A.volgensis, A.terebratuloides, A.fischeriana	Shale with Aucella okensis	Shale with Tollia cf. tolli, T.cf.payeri, Aucella volgensis	Shale with Hectoceras kochi	Shale with Subcraspedites, Aucella volgensis, A.trigonoides, A.okensis
				Shale with Praetollia maynci	
			Shale with Subcraspedites cf.suprasubditus, Aucella okensis	Conglomerate with Paracraspedites aff.spasskensis	

CORRELATION CHART OF THE CRETACEOUS FORMAT

Series	Stage	Zone	Barents Sea region (within the limits of the USSR)	North of the West-Siberian plain	Lena-Yenisei depression	Verknoyansk foredeep	Verkh
Upper (Cr_2)	Danian (Dn)		—	Clay with Anomalina praeacuta, Globigerina varianta.	—	Sand with Asplenium, Trochodendroides, Populus, Zizyphus, Platanus	—
	Maestrichtian (Mst)			Clay and marl with Baculites vertebralis, B.sibiricus, Gaudriceras pygmaeum	Sand with Baculites anceps v.leopoliensis, Tancredia americana	Sand and sandstone with Trochodendroides, Macclintockia, Credneria, Protophyllum, Viburnum, Nordenskioldia borealis	
	Campanian (Cmp)			Clay and gaize with Baculites cf. obtusus, Scaphites cuvieri	Clay and siltstone with Inoceramus sp.		Coal lava cho- lots
	Upper Santonian (Snt_2)		Sandstone and clay with Inoceramus patootensis, Oxytoma tenuicostata	Clay and gaize with Inoceramus steenstrupi, Oxytoma tenuicostata	Clay and siltstone with Inoceramus patootensis, In.steenstrupi, Oxytoma tenuicostata		
	Lower Santonian (Snt_1)		—	Clay and gaize with Actinocamax ex gr.verus, A.cf.propinquus	Siltstone with Inoceramus pachti		
	Coniacium (Cn)			Clay and gaize with Inoceramus cf.anomalis	Siltstone and sandstone with Inoceramus subinvolutus, In.russiensis, In.schei		
	Upper Turonian (Tur_2)			Clay with Baculites romanovskii, Gaudryina filiformis	Siltstone with Inoceramus lamarcki, In. interruptus, In.inaequivalvis, Borissjakoceras	Sand and sandstone with Menispermites, Sassafras, Dalbergites, Cissites, Sterculia	—
	Lower Turonian (Tur_1)			Clay with Inoceramus cf.labiatus, Gaudryina filiformis	Clay with Placenticeras cf.planum, Inoceramus cf.labiatus, Gaudryina cf.filiformis		Co lu Ci Gi Se ux
	Cenomanian (Cm)		Sandstone and siltstone with Schloenbachia varians, Schl.aff.subvarians, Oxytoma pectinata	Siltstone with Entolium ex gr. balticus, Inoceramus aff.amudariensis, Verneuilina asanoviensis	Sand and sandstone with Podocarpoxylon gothani		
Lower (Cr_1)	Upper Albian (Alb_3)		?	Clay and siltstone with Cleoniceras cf.bicurvatoides, Inoceramus anglicus, Ammobaculites agglutinans, Verneuilina praeasanoviensis, Milliammina rasilis	Coal-bearing deposits with Verneuilina praeasanoviensis, Milliammina rasilis, Ginkgo aff.pseudoadiantoides major, Sequoia sp.	Coal-bearing deposits with Asplenium aff. dicksonianum, Coniopteris adiantoides	
	Middle Albian (Alb_2)		Sandstone with Cleoniceras, Balduroceras ?				Coal- lava Conic Ginkg Sassa
	Lower Albian (Alb_1)						
	Aptian (Apt)		Sandstone with Deshayesites Basalt, tuff and sandstone with Cladophlebis rigida, Podozamites graminens, Pityophyllum staratschini	Clay, siltstone and sandstone with Mansisaurus sp.	Coal-bearing deposits with Ginkgo huttonii, Phoenicopsis angustifolia	Coal-bearing deposits with Sphaenobaiera, Podozamites, Jacutiella amurensis	
	Barremian (Br)			Claystone and siltstone with Sphaenopteris cf.fittonii, Podozamites lanceolatus			
	Upper Hauterivian (Ht_2)		Sandstone and clay with Simbirskites	Clay, siltstone and sandstone with Speetoniceras, Aulacoteuthis cf. absolutiformis, Cylindroteuthis necopinus	Coal-bearing deposits with Coniopteris nympharum, Podozamites eichwaldii, Corbula cf.sowerbyi, C.cf. sedgwickii	Coal-bearing deposits with Cladophlebis lenaensis, Cl.williamsonii, Corbula cf.sedgwickii, C. cf.sowerbyi	Sar
	Lower Hauterivian (Ht_1)		Sandstone with Cyrena cf.uvatica, C.cf.venulina	Sandstone, claystone and clay with Lingula	? Sandstone and siltstone with Polyptychites, Aucella sublaevis, Cylindroteuthis pachsensis		
	Upper Valanginian	Dichotomites bidichotomus	Clay with Dichotomites, Polyptychites polyptychus	Clay with Dichotomites ex gr. polytomus, Neocraspedites liapinensis	Clay and siltstone with Dichotomites, Neocraspedites, Bochianites demissus	Sandstone with flora remnants	
	Middle Valanginian	Astieriptychites astieriptychus	Sandstone with Euryptychites gravesiformis, Temnoptychites hoplitoides	Clay with Polyptychites aff.keyserlingi	Clay and siltstone with Astieriptychites, Polyptychites ramulicosta, Euryptychites	Sandstone, siltstone, claystone with Astieriptychites, Euryptychites, Polyptychites	S Au cr
		Temnoptychites syzranicus		Clay with Temnoptychites triptychiformis	Clay and siltstone with Temnoptychites, Euryptychites, Polyptychites aff.keyserlingi		
	Lower Valanginian	Tollia tolli	Sandstone with Tollia cf. stenomphala	Clay with Tollia stenomphala, T. sibirica, T.anabarensis, Aucella inflata	Clay and siltstone with Tollia, Acroteuthis lateralis, Aucella crassa	Sandstone and siltstone with Tollia, Aucella inflata	
		Paracraspedites spasskensis	Sanstone and clay with Paracraspedites spasskensis	Clay with Paracraspedites, Subcraspedites, Garniericeras tolliense, Aucella volgensis	Clay, siltstone and sandstone with Paracraspedites, Subcraspedites, Aucella volgensis	Clay and sandstone with Paracraspedites, Aucella volgensis	A

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FORMATIONS IN THE SOVIET AND THE FOREIGN ARCTIC

IJ_2

Verkhoyansk-Chukchi area	Anadyr-Koryak area	Alaska	Northern Canada	Greenland	Svalbard
	Coal-bearing deposits with Trochodendroides, Magnolia, Quercus, Viburnum, Asplenium	—	Coal-bearing deposits, lava	—	
	Sandstone, siltstone, tuff with Pachydiscus neubergicus, Brahmaites				
Coal-bearing deposits, lava, tuff with Trochodendroides, Cephalotaxopsis, Sequoia, Ginkgo	Sandstone, conglomerate, tuff with Eupachydiscus sp., Inoceramus cf. balticus	Beds with Parapuzosia, Pachydiscus		Shale with Acanthoscaphites quadrangularis, A.greenlandicus	
	Claystone and tuff with Inoceramus patootensis, Anapachydiscus naumanni, Eupachydiscus cf.levyi			Shale and sandstone with Inoceramus patootensis, In. steenstrupi, Oxytoma tenuicostata	
	Claystone and tuff with Inoceramus cardissoides	Siltstone an tuffite with Inoceramus a f.cardissoides		Sandstone and shale with Inoceramus ex gr.cardissoidem	
	Sandstone, claystone, tuff with Kossmaticeras, Inoceramus ex gr.lamarcki	Beds with Inoce amus vancouverensi	Shale	Shale with Scaphites ventricosus	—
	?	Shale and Inoceramus sandstone with cuvieri, In. lamarcki, In.subalatus	Sandstone and shale containing coal seams with Scaphites, Watinoceras, Inoceramus labiatus	Sandstone with Scaphites aff.lamberti, Prionotropis cf.woolgari, Borissjakoceras, Inoceramus lamarcki	
Coal-bearing deposits, lava and tuff with Cladophlebis frigida, Ginkgo adiantoides, Sequoia obovata, Quereuxia, Thuja, Viburnum	?	Shale and san Scaphites de tone with ceramus labi catulus, Ino kocer us, Borissja-			
	Sandstone, claystone, tuff with Tetragonites, Turrilites costatus, Inoceramus concentricus v. nipponicus	Sandstone and s Inoceramus atha iltstone with askensis	Shale and sandstone with Beudanticeras, Gastroplites, Hoplites	Shale and sandstone with Schloenbachia, Gaudryceras, Inoceramus crippsi, In. pictus	
				Shale and sandstone with Inoceramus anglicus, Aucellina caucasica	
Coal-bearing deposits, lava and tuff with Coniopteris onychioides, Ginkgo adiantoides, Sassafras kolymaensis	Sandstone, claystone, limestone and tuff with Sonneratia, Sandrioceras, Cleoniceras, Stolfzkaia, Beudanticeras, Inoceramus anglicus	Shale and sandstone with Cleoniceras, Lemuroceras, Gastroplites, Aucellina, Inoceramus anglicus		Sandstone and shale with Hoplites, Dimorphoplites, Euhoplites, Gastroplites	Sandstone with Arcthoplites cf.jachromensis
			Sandstone and shale	Sandstone and shale with Arcthoplites cf.jachromensis, Beudanticeras cf.hulenense	
	Sandstone, claystone and tuff with Aucellina aptiensis		Sandstone	Shale with Sanmartinoceras	Shale with Crioceras arcticum, Cr.gracile, Aucellina aff.caucasica, Inoceramus spitzbergensis
				Sandstone with Deshayesites, Ancyloceras aff.matheronianum	
			Shale with Crioceras cf.remondi, Aconeceras, Acroteuthis, Aucellina	—	Coal-bearing deposits with Ginkgo digitata
Sandstone with Simbirskites			Shale with Oxyteuthis jasikowi, Ox.pugio v. rimata		Coal-bearing deposits with Pityophyllum lindströmi
					Coal-bearing deposits with Lioplax polaris
					Coal-bearing deposits with Elatides curvifolia
?Shale with Aucella sublaevis	? Shale with Aucella sublaevis	? Shale with Aucella sublaevis	?Sandstone with Aucella	? Red sandstone with Lytoceras, Aucella	? Sandstone with Pecten ex gr.spitzbergensis
			Sandstone and silty clay with Aucella crassicollis	Limestone, sandstone, shale, gravelite with Polyptychites, Neocraspedites	Shale with Dichotomites beani, Aucella sublaevis
Shale and sandstone with Aucella keyserlingi, A. crassicollis, A.sublaevis, A.crassa	Shale, siltstone, sandstone, tuff with Aucella inflata, A.keyserlingi, A. ex gr.sublaevis, A.crassicollis	A.crassicollis, A.crassa	Sandstone and silty clay with Euryptychites aff. latissimus, E.globulosus	Limestone, sandstone, shale, gravelite with Polyptychites, Euryptychites	Shale with Polyptychites quadrifidus
			Shale with Tollia cf. tolli, T.cf.payeri, Aucella volgensis	Shale with Tollia payeri	
Shale and sandstone with Aucella volgensis, A. terabratuloides	Shale, siltstone, sandstone and tuff with Aucella lahuseni, A.volgensis, A.terebratuloides, A.fischeri- [illegible]	Shale with Aucella okensis		Shale with Hectoceras kochi	Shale with Subcraspedites, Aucella volgensis, A.trigonoides, A.okensis
			Shale with Subcraspedites cf.suprasubditus, Aucella okensis	Shale with Praetollia maynci	
				Conglomerate with Paracraspedites aff.spasskensis	

MIDDLE (J_2)	Upper Bathonian (Bt_2)		Clay with Arctocephalites arcticus		Siltstone with Arctocephalites	Claystone and siltstone with Arctocephalites aff.ellipticus
	Lower Bathonian (Bt_1)		Sandstone with Cranocephalites pompeckji		Clay and siltstone with Cranocephalites, Morrisiceras, Megateuthis	Clay and siltstone with Cranocephalites
	Bajocian (Bj)		Siltstone and clay without any fauna	Coal-bearing deposits with Sphenobaiera, Cladophlebis cf.nebbensis, Coniopteris hymenophylloides, C.maakiana, Equisetites.	Clay and siltstone with Pseudomonotis decussata, Arctotis sublaevis	Siltstone and sandstone with Hyperlioceras, Inoceramus ex gr.lucifer
	Upper Aalenian (Al_2)		Siltstone with Ludwigia cf. murchisonae, Oxytoma jacksoni		Sandy clay with Ludwigia concava, Arctotis lenaensis	Clay with Ludwigia concava
	Lower Aalenian (Al_1)				Beds with Pseudolioceras sp. (cf.beyrichi ?)	Siltstone with Pseudolioceras beyrichi
LOWER (J_1)	Toarcian (Tr)			Coal-bearing deposits with Cladophlebis haiburnensis, Cl.cf.denticulata, Neocalamites, Schizoneura	Siltstone and sandstone with Pseudolioceras sp., Nannobelus, Passaloteuthis tolli Clay and conglomerate with Dactylioceras aff.annulatum, D.mucronatum	Siltstone and clay with Dactylioceras gracile, Leda acuminata
	Domerian (Dm)				Clay, siltstone, conglomerate with Amaltheus margaritatus, Harpax, Myophoria laevigata	Siltstone with Amaltheus margaritatus, Harpax, Myophoria laevigata
	Pliensbachian (Pl)				Sandstone and conglomerate with Harpax	Sandstone and conglomerate with fossil plants
	Lotharingian (Lt)		Sandstone with interbedded conglomerates and siltstones with fossil plants		Sandstone and conglomerate with Pseudomonotis lisabeti	
	Sinemurian (Snm)					
	Hettangian (Htn)					

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Sandstone and shale with Arctocephalites arcticus, Inoceramus porrectus, Megateuthis	Claystone with Inoceramus ex gr. retrorsus	Beds with Arctocephalites	Sandstone with Cranocephalites vulgaris, Arctocephalites	Shale and sandstone with Arctocephalites	Sandstone and clay with Arctocephalites arcticus
		Beds with Reineckeia, Cranocephalites		Shale and sandstone with Cranocephalites pompeckji	
Shale and sandstone with Holcobelus blainvillei, Inoceramus lucifer		Beds with Sphaeroceras	Sandstone with Arkelloceras, Inoceramus lucifer		
		Beds with Normannites			
		Beds with Stephanoceras	Beds with Stephanoceras ?		
Shale and sandstone with Ludwigia concava, Mesoteuthis rhenana	Sandstone and siltstone with Mytiloides cf. amygdaloides, Inoceramus scorochodi	—	—	—	—
		Shale with Pseudolioceras whiteavesi, Tmetoceras, Erycites	Siltstone with Leioceras opalinum, Pseudolioceras m'clintocki		
Shale and siltstone with Pseudolioceras compactile, Cuspiteuthis tubularis	Sandstone, siltstone and tuff with Pseudolioceras compactile, Ps.cf.whitbiense, Pseudomonotis substriata	Shale with Pseudolioceras cf. compactile, Ps.cf.lythense	Beds with Pseudolioceras aff. compactile, Harpoceras cf. exaratum	Sandstone with Pseudolioceras compactile	Phosphorite conglomerate with Pseudolioceras compactile, Dactylioceras annuliferum
Shale and sandstone with Dactylioceras athleticum, Pseudolioceras whitbiense		Shale with Dactylioceras	Beds with Dactylioceras commune	Sandstone and conglomerate with Dactylioceras groenlandicum, Catacoeloceras	
Shale and sandstone with Amaltheus margaritatus, Harpoceras elegans, Harpax	Sandstone with Spiriferina, Oxytoma, Pentacrinus jurensis, P.cf.subangularis	Shale with Amaltheus cf. engelhardti, Lytoceras cf.fimbriatum	Beds with Amaltheus margaritatus, Prodactylioceras	? Sandstone, shale, conglomerate with Gervillia	
Shale and tuff with Uptonia jamesoni, Pseudoamaltheus laevis, Harpax		Shale with Arietites cf. bucklandi		Limestone with Beaniceras, Lytoceras fimbriatum	
				Limestone with Uptonia jamesoni	
Shale and tuff with Arietites siverti, Pentacrinus briareus, Pseudomonotis originalis			Beds with Echioceras, Oxynoticeras, Arctoasteroceras	? Beds with Gryphaea arcuata	
			Beds with Arnioceras sp.		
Shale and tuff with Psiloceras, Schlothemia, Pseudomonotis originalis			Beds with "Psiloceras"	Sandstone with Thaumatopteris	

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CORRELATION CHART OF THE YURASSIC FORMATIONS OF THE

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Series	Stage	Zone	Barents Sea region	North of the West-Siberian plain	Lena-Yenisei depression	Verkhoyansk foredeep
UPPER (J_3)	Upper Volgian Vlg$_2$		Sandstone with Craspedites cf.fragilis	Clay and siltstone with Craspedites okensis, Cr.aff. fragilis, Cr.cf.leptus, Kashpurites	Clay with Craspedites okensis, Taimyroceras, Perisphinctidae, Aucella fischeriana	
	Lower Volgian Vlg$_1$	Virgatites virgatus and Epivirgatites nikitini	Shale with Virgatites virgatus	Clay and siltstone with Laugeites stschurovskii	Clay with Laugeites ?, Aucella russiensis	
				with Pavlovia ? vogulica		
		Dorsoplanites dorsoplanum	Clay with Dorsoplanites panderi, D.dorsoplanus	with Behemoth sp.	Clay with Dorsoplanites aff. panderi, D.dorsoplanus, D. cf.triplex, Aucella mosquensis, A.gabbi	Clay with Dorsoplanites sp., Aucella mosquensis
				with Dorsoplanites spp.		
				with Dorsoplanites kurbskyi		
				with Pavlovia strajevskyi		
		Subplanites	?	with Pavlovia jatriensis u and Pectinatites	Clay and siltstone with Pectinatites, Subplanites rotor	Clay with Aucella lindstroemi, Pachyteuthis excentrica.
				with Subdichotomoceras and Subplanites		
	Kimmeridgian (Km)		Sandstone with Amoeboceras subtilicostatum	Clay with Aubacostephanus eudoxus, Amoeboceras sultilicostatum.	Clay and siltstone with Amoeboceras decipiens	
		Amoeboceras decipiens	Siltstone with Amoeboceras decipiens, A.bodylevskii	Clay with Aulacostephanus yo.	Clay and siltstone with Amoeboceras kochi, A.sokolovi	
		Amoeboceras kitchini	Siltstone with Amoeboceras kitchini, A.spathi	Clay with Rasenia uralensis, Amoeboceras kitchini	Clay and glauconite sandstone with Amoeboceras kitchini, Rasenia	
				Clay with Pictonia evoluta		
				Clay with Prorasenia sp.		
	Upper Oxfordian (Oxf$_2$)	Amoeboceras alternans	Sandstone and siltstone with Amoeboceras alternans	Clay with Ringsteadia	Clay and glauconite sandstone with Amoeboceras alternans	
				Clay with Amoeboceras alternans	Clay and siltstone with Amoeboceras alternoides	
	Lower Oxfordian (Oxf$_1$)	Cardioceras cordatum	Clay with Cardioceras anabarense	Clay with Cardioceras kostromense, C.cf.cordatum	Clay with Cardioceras cordatum, C.excavatum v.arctica	Siltstone with Cardioceras cf. excavatum v.arctica, C.anabarense
	Upper Callovian (Cl$_3$)	Longaeviceras keyserlingi	Clay with Longaeviceras ex gr.nikitini	Clay with Longaeviceras	Clay with Longaeviceras nikitini, L.novosemelicum	Siltstone with Longaeviceras
	Middle Callovian (Cl$_2$)	Cadoceras milascheviči	Clay with Cadoceras tschefkini	Clay and sandstone with Cosmoceras	Clay with Cadoceras milascheviči, S.tschefkini	Siltstone with Cadoceras tschefkini, C.milascheviči
	Lower Callovian (Cl$_1$)	Cadoceras elatmae	Clay with Cadoceras elatmae	Clay and sandstone with Macrocephallites	Clay with Cadoceras elatmae	Siltstone with Cadoceras elatmae
			Clay with Cadoceras ognevi		Clay and siltstone with Cadoceras ognevi	
		Arcticoceras ishmae	Clay with Arcticoceras ishmae		Clay and siltstone with Arcticoceras	~~Sandstone and~~ siltstone with Arcticoceras ishmae

SOVIET AND THE FOREIGN ARCTIC

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Verkhoyansk-Chukchi area	Anadyr-Koryak area	Alaska	Northern Canada	Greenland	Svalbard
Sandstone with Aucella fischeriana, A.russiensis	Sandstone, siltstone and claystone with Aucella fischeriana	?		Sandstone with Craspedites leptus, Cr.ferrugineus, Perisphinctidae	?
Sandstone, shale and tuff with Aucella mosquensis, A.orbicularis	?		? Beds with Dorsoplanites sp. ind., Camptonectes praecinctus	Sandstone with Dorsoplanites gracilis, Laugeites	
		Shale with Aucella mosquensis, A.rugosa, A.piochii	Shale with Aucella mosquensis, A.rugosa	Glauconite sandstone and clay with Pavlovia	Shale and sandstone with Dorsoplanites aff.panderi
	Sandstone, shale and tuff with Subplanites cf.sokolevi, Aucella mosquensis			Clay and sandstone with Pavlovia, Dorsoplanites, Pectinatites	
				Shale with Sphinctoceras, Subplanites	
	Sandstone and shale with Aucella tenuistriata, Cylindroteuthis cf.obelisca			Shale with Amoeboceras decipiens	Beds with Amoeboceras sokolovi
Shale and sandstone with Amoeboceras sp., Perisphinctes sp.				Shale with Amoeboceras kochi	
		Shale and sandstone with Amoeboceras, Aucella spitiensis, A.concentrica, A. bronni	Beds with Amoeboceras sp. ind., Rasenia ?	Shale with Rasenia borealis	Shale with Amoeboceras kitchini, Rasenia
				Shale with Rasenia orbignyi, Amoeboceras	
Beds with Amoeboceras alternans				Sandstone with Amoeboceras aff. alternoides, A.cf.alternans Sands with Ringsteadia	Shale with Amoeboceras alternoides
Beds with Cardioceras cordatum		Beds with Cardioceras sp.	Beds with Cardioceras aff. mirum	Shale with Cardioceras caelatum	?
				—	
Sandstone and tuff with Cardioceras sp.		Shale with Kosmoceras castor	—		Beds with Longaeviceras, Quenstedticeras
		Shale with Pseudocadoceras grewingki, Reineckeia cf. stuebeli			?
			Shale with Cadoceras, Kepplerites	Shale with Kepplerites tychonis, Cadoceras calyx	Shale and sandstone with Cadoceras and Kepplerites
Beds with Arcticoceras ishmae		Shale with Arcticoceras sp.	Shale with Arcticoceras	Shale and sandstone with Arcticoceras	

CORRELATION TABLE OF THE QUATERNARY (ANTHROPOGENE) FORMATIONS OF THE SOVIET AND FOREIGN ARCTIC

Series	Stages	formations	Time intervals in t y till today by N.N.Lapina	North of the European part of the USSR (Pechora basin)	West-Siberian and Taimyr plains	Central-Siberian plateau	Coastal plains along the stretch of the Laptew, East-Siberian and Chukchi sea coasts	North-East of the USSR	Islands of the Soviet Arctic	Alaska and Cordilljera	Central part of North America
Upper (Holocene)		post-glacial	Recent 0 down to 9-10	Alluvium of the first-level terrace and flood plain	Alluvium of the first-level terrace and flood plain	Alluvium of the first-level terrace and flood plain. Scree covering the slopes	Alluvium of the first-level terrace and flood plain. Lacustrine sediments	Alluvium of the first-level terrace and flood plain. Scree covering the slopes	Marine deposits along the stretch of the coast	Recent alluvium	Recent alluviu
Middle (Pleistocene)	Upper (Valdai)	glacial	cold 9 10 till 20 warm 20 till 30 cold 30 till 65	Fluviolacustrine lateglacial deposits. The Ostashkow and Kalinin drift.	Fluviolacustrine and sandr deposits. Moraine and fluvioglacial deposits of the Zyryanka sheet glaciation (two substages)	Kars; moraines of the upper parts of the valleys. Moraines and fluvioglacial deposits of the Zyryanka glaciation on plateaus and highest terraces	Fluviolacustrine deposits containing the mammoth remains	Moraines in the kars. Moraines (two substages) of the valley-mountain glaciation	End moraines on the lowest terrace. Marine deposits. Lacustrine deposits. Zyryanka drift or erraties.	Moraines in the Kars. Fluviolacustrine deposits. Moraines (two substages) of the Visconsin glaciation	Visconsin drift Valde Manka Carry Tazev Jowa Pine
		inter-glacial	warm (boreal) 65 till 105	Marine deposits of the Boreal transgression	Marine deposits of the Boreal transgression (Messo-river, Sanchugovka-river and Kazantseva-river members)	Lacustrine deposits in troughs. Alluvium of the fourth-level terrace	Lagoonal (?) deposits	Erosional cut. Marine beds along the stretch of coast	Marine deposits of the highest terrace.	Erosional cut. Marine deposits along the stretch of the coast	Sangamon intergla deposits: lacustr deposits (Toronto mation), peats, soils
	Middle (Dnieper)	glacial	cold >105 ago	Moscow and Dnieper drift ~~[illegible]~~	Moraines of the Taz substage (at the Turukhan river). Interstadial beds. Moraine of the Samarovo substage.	Erratics and moraines of the Maximum Glaciation		Erratics on the plateau heigher than 1000m	Erratics	The Nome-river, the Iron-creek and other drift somewhere divided into two substages	Illinoian drift, vided into two su stages by the bur soil
		inter-gla-cial			Alluvium and marine beds in the buried valleys	Alluvium of the fifth-level terrace	Beds with Bison priscus longicornis	Eruptions lava in the Koryak-range		Basaltic lava eruption	Yarmouth intergla deposits. Buried Peats
	Lower (Oka)	gla-cial			Moraine-like beds in the buried valleys (the Nyda river)	Alluvium of the sixth-level terrace. Fossil mammals (Elephas wüsti)	Beds with the taiga-mountain fossil plants (Picea Wollowowiezii and oth.)	Beds with the taiga-mountain fossil plants (Pinus monticola and oth.)			Kansan drift (wes Mississippi river
		inter-gla-cial			Clay deposits with the Tr-Q spore-complex						Aftonian intergl deposits
Lower (Eopleistocene)						Pebble and clay deposits on the watershed plateau. Fossil mammals (Elephas meridionalis).	Beds with the coniferous-broadleaved flora (Pinus minticola, Juglans cinerea and oth.)	Beds with the coniferous-broadleaved flora (Tsuga minuta, Juglans cinerea). Marine beds with Glycimeris yessonensis and oth.			Nebraskan drift

CORRELATION TABLE OF THE QUATERNARY (ANTHROPOGENE) FORMATIONS OF THE SOVIET AND FOREIGN ARCTIC

	Central-Siberian plateau	Coastal plains along the stretch of the Laptew, East-Siberian and Chukchi sea coasts	North-East of the USSR	Islands of the Soviet Arctic	Alaska and Cordilljera	Central part of North America	Scandinavia	Age on C^{14} in t y till today, by R.Flint, 1957	Correlation with the Northern Alps
rst-	Alluvium of the first-level terrace and flood plain. Scree covering the slopes	Alluvium of the first-level terrace and flood plain. Lacustrine sediments	Alluvium of the first-level terrace and flood plain. Scree covering the slopes	Marine deposits along the stretch of the coast	Recent alluvium	Recent alluvium	Recent alluvium. Lacustrine deposits	> 6,7	Holocene
nd gla- he ci- es)	Kars; moraines of the upper parts of the valleys. Morains and fluvioglacial deposits of the Zyryanka glaciation on plateaus and highest terraces	Fluviolacustrine deposits containing the mammoth remains	Moraines in the kars. Moraines (two substages) of the valley-mountain glaciation	End moraines on the lowest terrace. Marine deposits. Lacustrine deposits. Zyryanka drift or erratics.	Moraines in the Kars. Fluviolacustrine deposits. Moraines (two substages) of the Visconsin glaciation	Visconsin drift Valders Mankato Carry Tazewell Jowa Pinedale	Salpauselkä Late Dryas Early Dryas Brandenburg	10-11 13 > 18 40-60	Würm late main early
the m u- an-)	Lacustrine deposits in troughs. Alluvium of the fourth-level terrace	Lagoonal (?) deposits	Erosional cut. Marine beds along the stretch of coast	Marine deposits of the highest terrace.	Erosional cut. Marine deposits along the stretch of the coast	Sangamon interglacial deposits: lacustrine deposits (Toronto formation), peats, buried soils	Marine deposits of the Boreal (Eemian) transgression. Peats.		Riss-Würm
ru- -	Erratics and moraines of the Maximum Glaciation		Erratics on the plateau heigher than 1000m	Erratics	The Nome-river, the Iron-creek and other drift somewhere divided into two substages	Illinoian drift, divided into two substages by the buried soil			Riss
beds	Alluvium of the fifth-level terrace	Beds with Bison priscus longicornis	Eruptions lava in the Koryak-range		Basaltic lava eruption	Yarmouth interglacial deposits. Buried soil. Peats			Mindel-Riss
m	Alluvium of the sixth-level terrace. Fossil mammals (Elephas wüsti)	Beds with the taiga-mountain fossil plants (Picea wollowewiczii and oth.)	Beds with the taiga-mountain fossil plants (Pinus monticola and oth.)			Kansan drift (west from Mississippi river)			Mindel
lex						Aftonian interglacial deposits			Günz-Mindel
	Pebble and clay deposits on the watershed plateau. Fossil mammals (Elephas meridionalis).	Beds with the coniferous-broadleaved flora (Pinus minticola, Juglans cinerea and oth.)	Beds with the coniferous-broadleaved flora (Tsuga minuta, Juglans cinerea). Marine beds with Glycimeris yessonensis and oth.			Nebraskan drift			Günz

CORRELATION CHART OF THE YURASSIC FORMATIONS OF THE SOVIET AND THE FOREIGN ARC

Series	Stage	Zone	Barents Sea region	North of the West-Siberian plain	Lena-Yenisei depression	Verkhoyansk foredeep	Verkhoyansk-Chukchi ar
UPPER (J_3)	Upper Volgian Vlg_2		Sandstone with Craspedites cf.fragilis	Clay and siltstone with Craspedites okensis, Cr.aff. fragilis, Cr.cf.leptus, Kashpurites	Clay with Craspedites okensis, Taimyroceras, Perisphinctidae, Aucella fischeriana		Sandstone with Aucella ana, A.russiens
	Lower Volgian Vlg_1	Virgatites virgatus and Epivirgatites nikitini	Shale with Virgatites virgatus	with Laugeites stschurovskii	Clay with Laugeites ?, Aucella russiensis		Sandstone, shale and with Aucella mosquens A.orbicularis
				with Pavlovia ? vogulica			
		Dorsoplanites dorsoplanum	Clay with Dorsoplanites panderi, D.dorsoplanus	with Behemoth sp.	Clay with Dorsoplanites aff. panderi, D.dorsoplanus, D. cf.triplex, Aucella mosquensis, A.gabbi	Clay with Dorsoplanites sp., Aucella mosquensis	
				Clay and siltstone with Dorsoplanites spp.			
				with Dorsoplanites kurbskyi			
				with Pavlovia strajevskyi			
		Subplanites	?	with Pavlovia jatriensis and Pectinatites	Clay and siltstone with Pectinatites, Subplanites rctor		
				with Subdichotomoceras and Subplanites			
	Kimeridgian (Km)		Sandstone with Amoeboceras subtilicostatum	Clay with Aubacostephanus eudoxus, Amoeboceras sultilicostatum.	Clay and siltstone with Amoeboceras decipiens	Clay with Aucella lindstroemi, Pachyteuthis excentrica.	Shale and sandstone Amoeboceras sp., Perisphinktes sp.
		Amoeboceras decipiens	Siltstone with Amoeboceras decipiens, A.bodylevskii	Clay with Aulacostephanus yo.	Clay and siltstone with Amoeboceras kochi, A.sokolovi		
		Amoeboceras kitchini	Siltstone with Amoeboceras kitchini, A.spathi	Clay with Rasenia uralensis, Amoeboceras kitchini	Clay and glauconite sandstone with Amoeboceras kitchini, Rasenia		
				Clay with Pictonia evoluta			
				Clay with Prorasenia sp.			
	Upper Oxfordian (Oxf_2)	Amoeboceras alternans	Sandstone and siltstone with Amoeboceras alternans	Clay with Ringsteadia	Clay and glauconite sandstone with Amoeboceras alternans		Beds with Amoeboceras
				Clay with Amoeboceras alternans	Clay and siltstone with Amoeboceras alternoides		
	Lower Oxfordian (Oxf_1)	Cardioceras cordatum	Clay with Cardioceras anabarense	Clay with Cardioceras kostromense, C.cf.cordatum	Clay with Cardioceras cordatum, C.excavatum v.arctica	Siltstone with Cardioceras cf. excavatum v.arctica, C.anabarense	Beds with Cardioceras
	Upper Callovian (Cl_3)	Longaeviceras keyserlingi	Clay with Longaeviceras ex gr.nikitini	Clay with Longaeviceras	Clay with Longaeviceras nikitini, L.novosemelicum	Siltstone with Longaeviceras	Sandstone and tuff wi Cardioceras sp.
	Middle Callovian (Cl_2)	Cadoceras milaschevići	Clay with Cadoceras tschefkini	Clay and sandstone with Cosmoceras	Clay with Cadoceras milaschevići, C.tschefkini	Siltstone with Cadoceras tschefkini, C.milaschevići	
	Lower Callovian (Cl_1)	Cadoceras elatmae	Clay with Cadoceras elatmae	Clay and sandstone with Macrocephallites	Clay with Cadoceras elatmae	Siltstone with Cadoceras elatmae	
			Clay with Cadoceras ognevi		Clay and siltstone with Cadoceras ognevi		
		Arcticoceras ishmae	Clay with Arcticoceras ishmae		Clay and siltstone with Arcticoceras	Sandstone and siltstone with Arcticoceras ishmae	Beds with Arcticoceras
MIDDLE (J_2)	Upper Bathonian (Bt_2)		Clay with Arctocephalites arcticus		Siltstone with Arctocephalites	Claystone and siltstone with Arctocephalites aff.ellipticus	Sandstone and shale cephalites arcticus, porrectus, Megateuth
	Lower Bathonian (Bt_1)		Sandstone with Cranocephalites pompeckji		Clay and siltstone with Cranocephalites, Morrisiceras, Megateuthis	Clay and siltstone with Cranocephalites	
	Bajocian (Bj)		Siltstone and clay without any fauna	Coal-bearing deposits with Sphenobaiera, Cladophlebis cf.nebbensis, Coniopteris hymenophylloides, C.maakiana, Equisetites.	Clay and siltstone with Pseudomonotis decussata, Arctotis sublaevis	Siltstone and sandstone with Hyperlioceras, Inoceramus ex gr.lucifer	Shale and sandstone Holcobelus blainvill mus lucifer
	Upper Aalenian (Al_2)		Siltstone with Ludwigia cf. murchisonae, Oxytoma jacksoni		Sandy clay with Ludwigia concava, Arctotis lenaensis	Clay with Ludwigia concava	Shale and sandstone Ludwigia concava, Me teuthis rhenana
	Lower Aalenian (Al)				Beds with Pseudolioceras sp. (cf.beyrichi ?)	Siltstone with Pseudolioceras beyrichi	
LOWER (J_1)	Toarcian (Tr)				Siltstone and sandstone with Pseudolioceras sp., Nannobelus, Passaloteuthis tolli	Siltstone and clay with Dactylioceras gracile, Leda acuminata	Shale and siltstone Pseudolioceras comp Cuspiteuthis tubula
					Clay and conglomerate with Dactylioceras aff.annulatum, D.mucronatum		Shale and sandstone Dactylioceras athle Pseudolioceras whit
	Domerian (Dm)				Clay, siltstone, conglomerate with Amaltheus margaritatus, Harpax, Myophoria laevigata	Siltstone with Amaltheus margaritatus, Harpax, Myophoria laevigata	Shale and sandston Amaltheus margarit Harpoceras elegans
	Pliensbachian (Pl)				Sandstone and conglomerate with Harpax		Shale and tuff with jamesoni, Pseudoamu laevis, Harpax
	Lotharingian (Lt)			Coal-bearing deposits with Cladophlebis haiburnensis, Cl.cf.denticulata, Neocalamites, Schizoneura	Sandstone and conglomerate with Pseudomonotis lisabeti	Sandstone and conglomerate with fossil plants	Shale and tuff with Arietites siverti, briareus, Pseudomono nalis
	Sinemurian (Snm)		Sandstone with interbedded conglomerates and siltstones with fossil plants				
	Hettangian (Htn)						Shale and tuff with Schlothemia, Pseudom ginalis

AND THE FOREIGN ARCTIC

hoyansk-Chukchi area	Anadyr-Koryak area	Alaska	Northern Canada	Greenland	Svalbard
lstone with Aucella fischeriana, A.russiensis	Sandstone, siltstone and claystone with Aucella fischeriana			Sandstone with Craspedites leptus, Cr.ferrugineus, Perisphinctidae	
			? Beds with Dorsoplanites sp. ind., Camptonectes praecinctus	Sandstone with Dorsoplanites gracilis, Laugeites	
dstone, shale and tuff h Aucella mosquensis, rbicularis					
				Glauconite sandstone and clay with Pavlovia	
	Sandstone, shale and tuff with Subplanites cf.sokolovi, Aucella mosquensis	Shale with Aucella mosquensis, A.rugosa, A.piochii	Shale with Aucella mosquensis, A.rugosa	Clay and sandstone with Pavlovia, Dorsoplanites, Pectinatites	Shale and sandstone with Dorsoplanites aff.panderi
				Shale with Sphinctoceras, Subplanites	
				Shale with Amoeboceras decipiens	Beds with Amoeboceras sokolovi
le and sandstone with eboceras sp., Peri- phinctes sp.				Shale with Amoeboceras kochi	
				Shale with Rasenia borealis	
		Shale and sandstone with Amoeboceras, Aucella spitiensis, A.concentrica, A. bronni	Beds with Amoeboceras sp. ind., Rasenia ?	Shale with Rasenia orbignyi, Amoeboceras	Shale with Amoeboceras kitchini, Rasenia
s with Amoeboceras alternans	Sandstone and shale with Aucella tenuistriata, Cylindroteuthis cf.obelisca			Sandstone with Amoeboceras aff. alternoides, A.cf.alternans Sands with Ringsteadia	Shale with Amoeboceras alternoides
s with Cardioceras cordatum		Beds with Cardioceras sp.	Beds with Cardioceras aff. mirum	Shale with Cardioceras caelatum	?
		Shale with Kosmoceras castor			Beds with Longaeviceras, Quenstedticeras
dstone and tuff with dioceras sp.					
		Shale with Pseudocadoceras grewingki, Reineckeia cf. stuebeli			?
			Shale with Cadoceras, Kepplerites	Shale with Kepplerites tychonis, Cadoceras calyx	Shale and sandstone with Cadoceras and Kepplerites
with Arcticoceras ishmae		Shale with Arcticoceras sp.	Shale with Arcticoceras	Shale and sandstone with Arcticoceras	
ndstone and shale with Arcto- phalites arcticus, Inoceramus rrectus, Megateuthis		Beds with Arctocephalites	Sandstone with Cranocephalites vulgaris, Arctocephalites	Shale and sandstone with Arctocephalites	Sandstone and clay with Arctocephalites arcticus
	Claystone with Inoceramus ex gr. retrorsus	Beds with Reineckeia, Cranocephalites		Shale and sandstone with Cranocephalites pompeckji	
ale and sandstone with lcobelus blainvillei, Inocera- s lucifer		Beds with Sphaeroceras	Sandstone with Arkelloceras, Inoceramus lucifer		
		Beds with Normannites			
		Beds with Stepnanoceras	Beds with Stephanoceras ?		
ale and sandstone with dwigia concava, Mesoteuthis rhenana	Sandstone and siltstone with Mytiloides cf. amygdaloides, Inoceramus scorochodi	Shale with Pseudolioceras whiteavesi, Tmetoceras, Erycites	Siltstone with Leioceras opalinum, Pseudolioceras m'clintocki		
Shale and siltstone with seudolioceras compactile, Cuspiteuthis tubularis	Sandstone, siltstone and tuff with Pseudolioceras compactile, Ps.cf.whitbiense, Pseudomonotis substriata	Shale with Pseudolioceras cf. compactile, Ps.cf.lythense	Beds with Pseudolioceras aff. compactile, Harpoceras cf. exaratum	Sandstone with Pseudolioceras compactile	Phosphorite conglomerate with Pseudolioceras compactile, Dactylioceras annuliferum
hale and sandstone with Dactylioceras athleticum, Pseudolioceras whitbiense		Shale with Dactylioceras	Beds with Dactylioceras commune	Sandstone and conglomerate with Dactylioceras groenlandicum, Catacoeloceras	
Shale and sandstone with Amaltheus margaritatus, Harpoceras elegans, Harpax		Shale with Amaltheus cf. engelhardti, Lytoceras cf.fimbriatum	Beds with Amaltheus margaritatus, Prodactylioceras	? Sandstone, shale, conglomerate with Gervillia	
				Limestone with Beaniceras, Lytoceras fimbriatum	
Shale and tuff with Uptonia jamesoni, Pseudoamaltheus laevis, Harpax	Sandstone with Spiriferina, Oxytoma, Pentacrinus jurensis, P.cf.subangularis			Limestone with Uptonia jamesoni	
		Shale with Arietites cf. bucklandi	Beds with Echioceras, Oxynoticeras, Arctoasteroceras		
Shale and tuff with rietites siverti, Pentacrinus riareus, Pseudomonotis originalis				? Beds with Gryphaea arcuata	
			Beds with Arnioceras sp.		
Shale and tuff with Psiloceras, Schlotheimia, Pseudomonotis originalis			Beds with "Psiloceras"	Sandstone with Thaumatopteris	

CORRELATION CHART OF THE PALEOGENE AND NEOGEN FORMATIONS IN THE SOVIET ARCTIC

System	Series	Sub-series	North of the West Siberian Plain	North of Central Siberia	Verkhoyansk-Chukchi Area	Anadyr-Koryak area
NEOGEN	Pliocene	Upper		Sands with flora remnants	Argillite, sand, shale, conglomerate with Juglans cinerea, pollen of the broad-leaved trees	Coalbearing deposits, lava, tuff with Mya arenaria v.japonica
		Middle				Conglomerate, sandstone with Glycimeris anatolensis, Anadara trilineata
		Lower				Sandstone, tuff with Swiftopecten swiftii v.etchegoini, Tellina pulchra
	Miocene	Upper	Aleurite and clay with flora remnants Melosira islandica		Coal-bearing deposits with Sequoia langsdorfii, Taxodium dubium, Macoma nasuta, Arca obispoana	Sandstone, conglomerate with Glycimeris chitanii, Mytilus chejsleveemensis
		Middle				Sandstone, conglomerate, lava, tuff with Yoldia ex gr.choensis, Cardita korfensis
		Lower				Claystone with Nuculana napanica, Yoldia cerussata
PALEOGENE	Oligocene	Upper	Sand and clay with flora		Coal-bearing deposits and tuff with Asplenium, Osmunda heeri, Metasequoid disticha	Claystone, sandstone, conglomerate with Solemya dalli, Variamussium pillarense, Psephaca weaveri
		Middle				
		Lower	Diatom clay and clay with Meretrix incrassata Miliolina ex gr.selena, Cibicides khanabadensis, Elphidium riscntanicum, Mel.clavigera.			Sandstone, siltstone, conglomerate with Nuculana anatolensis, Nemocardium kovatschensis, Thracia kovatschensis
	Eocene	Upper	Diatom clay and diatomite with Melosira sulcata, Pyxilla gracilis		Coal-bearing deposits, lava and tuff with Equisetum arcticum, Juglans juglandiformis, Corylus kenaiana	Conglomerate, sandstone, shale with Mytilus littoralis, M. yokoyami
		Middle	Diatom clay and diatomite with Coscinodiscus uralensis, C.moelleri, Theocosphaera			
		Lower	Gaize and diatomite with Triceratium fenestratum .	Clay, sand and siltstone with Trochodendroides arctica, Nordenskiöldia borealis, Liquidambar europaea	Coal-bearing deposits with Taxites orlikii, Vitis islandica, Quercus platania	
	Paleocene		Clay with Cibicides favorabilis		Coal-bearing deposits, lava and tuff with Trochodendroides smilacifolius, Juglans cf.nigella, Corylus maequarii.	Coal-bearing deposits with Acila aff.decisa, Nuculana gabbi, Scaphander costatus
			Clay with Ammobaculites incultus			

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CORRELATION CHART OF THE PALEOGENE AND NEOGEN FORMATIONS IN THE SOVIET ARCTIC

System	Series	Sub-series	North of the West Siberian Plain	North of Central Siberia	Verkhoyansk-Chukchi Area	Anadyr-Koryak area
NEOGEN	Pliocene	Upper		Sands with flora remnants	Argillite, sand, shale, conglomerate with Juglans cinerea, pollen of the broad-leaved trees	Coalbearing deposits, lava, tuff with Mya arenaria v.japonica ✓
		Middle				Conglomerate, sandstone with Glycimeris anatolensis, Anadara trilineata
		Lower				Sandstone, tuff with Swiftopecten swiftii v.etchegoini, Tellina pulchra
	Miocene	Upper	Aleurite and clay with flora remnants Melosira islandica		Coal-bearing deposits with Sequoia langsdorfii, Taxodium dubium, Macoma nasuta, Arca obispoana	Sandstone, conglomerate with Glycimeris chitanii, Mytilus chejsleveemensis
		Middle				Sandstone, conglomerate, lava, tuff with Yoldia ex gr.choensis, Cardita korfensis
		Lower				Claystone with Nuculana napanica, Yoldia cerussata
PALEOGENE	Oligocene	Upper	Sand and clay with flora		Coal-bearing deposits, and tuff with Asplenium, Osmunda heeri, Metasequoia disticha	Claystone, sandstone, conglomerate with Solemya dalli, Variamussium pillarense, Psephaea weaveri
		Middle				
		Lower	Diatom clay and clay with Meretrix incrassata Miliolina ex gr.selena, Cibicides khanabadensis, Elphidium rischtanicum, Mel.clavigera.			Sandstone, siltstone, conglomerate with Nuculana snatolensis, Nemocardium kovatschensis, Thracia kovatschensis
	Eocene	Upper	Diatom clay and diatomite with Melosira sulcata, Pyxilla gracilis		Coal-bearing deposits, lava and tuff with Equisetum arcticum, Juglans juglandiformis, Corylus kenaiana	Conglomerate, sandstone, shale with Mytilus littoralis, M. yokoyami ✓
		Middle	Diatom clay and diatomite with Coscinodiscus uralensis, C.moelleri, Theocosphaera	Clay, sand and siltstone with Trochodendroides arctica, Nordenskiöldia borealis, Liquidambar europaea		
		Lower	Gaize and diatomite with Triceratium fenestratum .		Coal-bearing deposits with Taxites orlikii, Vitis islandica, Quercus platania	Coal-bearing deposits with Acila aff.decisa, Nuculana gabbi, Scaphander costatus
	Paleocene		Clay with Cibicides favorabilis		Coal-bearing deposits, lava and tuff with Trochodendroides smilacifolius, Juglans cf.nigella, Corylus maequarii.	
			Clay with Ammobaculites incultus			

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ARCTIC GEOLOGY

This list of Delegates is being supplied to all Registrants with the hope that all may find it a useful reference.

A supplement, which will include Delegates registering on Sunday and Monday, will be prepared and will be available at the Registration Desk in the Jubilee Auditorium on Tuesday, January 12, 1960.

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BARNES, D. F.	U. S. Dept. of Interior, Geological Survey, Menlo Park, California.	Palliser Hotel
BARSDATE, R. J.	University of Pittsburgh, Pittsburgh, Pennsylvania.	Palliser Hotel
BARSS, D. L.	Triad Oil Co. Ltd., Calgary.	Home
BARTHELEMES, Dr. A. J.	Seismograph Service Corporation, Tulsa, Oklahoma.	
BARTLETT, T. P.	Peter Bawden Drlg. Co., Calgary.	Home
BATEMAN, J. D.	Dominion Explorers Limited, Toronto, Ontario.	Palliser Hotel
BAUMAN, P. T.	Sunray Oil Company, Calgary.	Home
BAWDEN, P. C.	Peter Bawden Drilling Ltd., Calgary.	Home
BEACH, F. K.	Consultant, Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
BEATTIE, K.	Triad Oil Co. Ltd., Calgary.	Home
BEAVAN, A. P.	British Newfoundland Exploration Ltd. Montreal, Quebec.	Palliser Hotel
BEDIZ, P. I.	Century Geophysical Co. of Canada, Calgary.	Home
BEE, J. L.	Canadian Fina Oil Ltd., Calgary.	Home
BELCHER, A. T.	Arctic Institute of North America, Montreal, Quebec.	
BELL, E. J.	Imperial Oil Ltd., Calgary.	Home
BELL, J. A.	French Petroleum Co. of Canada, Ltd., Calgary.	Home
BELTZ, E. W.	Consultant, Calgary.	Home
BENSON, D. G.	Colorado Oil and Gas Corporation, Denver, Colorado.	
BERRY, A. D.	Anglo American Exploration Ltd., Calgary.	Home
BERTHELSEN, A.	Geological Survey of Greenland, Copenhagen, Denmark.	Palliser Hotel
BESCHEL, R. E.	Queen's University, Dept. of Biology, Kingston, Ontario.	
BEST, E. W.	Triad Oil Co. Ltd., Calgary, Alberta.	Home
BILAN, L. J.	Student, U. of Alberta, Edmonton, Alberta.	
BILY, C.	Imperial Oil Ltd., Dawson Creek, B. C.	Royal Hotel
BINDA, L. S.	Supertest Petroleum Corp. Calgary.	Home
BISSETT, J. D.	Accurate Exploration Ltd. Calgary.	Home
BLACKADAR, R. G.	Geological Survey of Canada, Ottawa, Ontario.	Royal Hotel
BLACKLEDGE, G. E.	Seismograph Service Corporation of Canada, Calgary.	Home
BLAHA, J. A.	Midwest Oil Corporation, Calgary.	Home
BLAKE, W. Jr.	Dept. of Geology, Ohio State University & IGY Antartic Glaciology Data Reduction Center., Columbus, Ohio.	Wales Hotel
BLUE, J. F.	Cree Oil of Canada, Calgary.	Home
BRADSHAW, B. A.	Kennarctic Explorations Ltd., Toronto, Ontario.	Palliser Hotel
BRADY, B.	Union Oil of California, Calgary.	Home
BRAUN, L. T.	Geophoto Services Ltd., Calgary.	Home
BRECHTEL, F. C.	Geophoto Services Ltd., Calgary.	Home
BRENNAN, D. F.	Geophysical Service International Corp., Calgary.	Home
BREWER , M. C.	Arctic Research Laboratory, Barrow, Alaska.	Royal Hotel
BRISBIN, W. C.	University of Manitoba, Winnipeg, Manitoba.	Wales Hotel
BRITTON, Dr. M. E.	Arctic Research Project, Washington, D. C.	Palliser Hotel
BROSCOE, A. J.	Geophoto Services Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
BROWN, J. R.	Western Leaseholds Ltd., Calgary.	Home
BROWN, R.	Can. Strat. Service Ltd., Calgary.	Home
BROWN, R. A.	Shell Oil Co. of Canada Ltd., Edmonton, Alberta.	
BROWN, R. J. E.	Div. of Bldg. Research - National Research Council, Ottawa, Ontario.	Wales Hotel
BROWNELL, G. M.	University of Manitoba, Winnipeg, Manitoba.	Wales Hotel
BROWNELL, J. C.	Scanus, Inc., San Diego, California.	Palliser Hotel
BRUCE, D. D.	State of Alaska - Div. of Mines & Minerals, Anchorage, Alaska.	
BRUMWELL, N. S.	Amerada Petroleum Corp. Calgary.	Home
BRUNDALL, L.	Geophoto Services Ltd., Denver, Colorado.	
BUCKLE, R. F.	Rotary Engineers of Canada, Calgary.	Home
BUTKOVICH, T. R.	U. of Calif. Lawrence Radiation Lab., Livermore, California.	Royal Hotel
BUTLER, W. M.	Tidewater Oil Co., Calgary.	Home
BUTT, W. H.	Atlantic Refining Co., Dallas, Texas.	
BUTTERFIELD, G. E.	Amerada Petroleum Corp. Calgary.	Home
BYRNE, A. W.	Texaco Exploration Co., Calgary.	Home
CALDWELL, W. G. E.	University of Saskatchewan, Saskatoon, Saskatchewan.	Palliser Hotel
CAMPBELL, D. L.	J. C. Sproule & Assoc., Calgary.	Home
CAMPBELL, N. J.	Fisheries Research Board of Canada St. Andrews, N. B.	Palliser Hotel
CAMPBELL, W. G.	Western Minerals Ltd., Calgary.	Home
CARLYLE, H. M.	Imperial Oil Co. Ltd., Calgary.	Home
CARR, W. L.	Pure Oil Company, Chicago, Illinois.	Palliser Hotel
CARTER, E. W.	Carter Mapping Limited, Calgary.	Home
CARTER, L.	Stone & Webster Canada Ltd., Calgary.	Home
CASTLEBERRY, F.	Atlantic Refining Co., Calgary.	Home
CEDERSTROM, D. J.	U. S. Geological Survey - Foreign Hydrology Section, Falls Church, Virginia.	Wales Hotel
CHADWICK, R. H. W.	Bear Creek Mining Company, Spokane, Washington.	
CHAPMAN, R. M.	U. S. Gov't - Geol. Survey, Denver, Colorado.	Palliser Hotel
CHAPUT, U. J.	Imperial Oil Limited Dawson Creek, B. C.	Royal Hotel
CHARLES, W. W. Jr.	Canadian Oil Companies Ltd., Calgary.	Home
CHERNOFF, C. N.	Chevron Oil Co., Calgary,	Home
CHILDS, G. D.	British American Oil Co., Calgary.	Home

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CHRISTIE, K. J.	Federal Government, Ottawa, Ontario.	Palliser Hotel
CHRISTOFFERSON, K. A.	Ohio Oil Co., Calgary.	Home
CLARK, D. J. A.	Canadian Oil Companies Ltd., Calgary.	Home
CLARK, D. R.	Union Oil Co. of California, Calgary.	Home
CLARK, F. T.	Cities Service Oil Co., Bartlesville, Oklahoma.	Palliser Hotel
CLAWSON, W. W.	Mobil Oil Company, New York, N. Y.	Palliser Hotel
COLLIN, A. E.	Dept. of Mines and Technical Surveys, Ottawa, Ontario.	Wales Hotel
COLLINS, G. M. Jr.	V. Zay Smith Assoc. Calgary.	Home
CONNOLLY, W. D.	Union Oil of California Edmonton, Alberta.	Palliser Hotel
CONNOR, E. J.	Union Oil of California, Calgary.	Home
COOK, B. L .	Canada Oil Lands Ltd., Calgary.	Home
COOK, F. A.	Dept. of Mines & Tech. Surveys, Ottawa, Ontario.	Royal Hotel
COOKE, D. Y.	Cree Oil of Canada (1958) Ltd., Calgary.	Home
COONEY, P. J.	Ohio Oil Co., Calgary.	Home
COPELAND, R. J.	British American Oil Co., Calgary.	Home
CORTE, A. Dr.	U. S. Army Corps, Willmette, Illinois.	Palliser Hotel
COTE, P. E.	Imperial Oil Ltd., Calgary.	Home
COTTON, C. B.	Tidewater Oil Co., Calgary.	Home
COVENEY, J. W.	The California Standard Co., Calgary.	Home
COWIE, J. W.	University of Bristol, Bristol, England.	
CRAIG, R. W.	Texaco Exploration Co., Calgary.	Home
CREAGER, J. S.	University of Washington, Seattle, Washington.	Palliser Hotel
CREWSON, J. S.	Gt. Plns. Dev. Co. of Canada, Ltd. Calgary.	Home
CRICKMAY, C. H.	Imperial Oil Limited, Calgary.	Home
Cromie, W. J.	Columbia University, Palisades, N. Y.	Palliser Hotel
CROTEAU, F. L.	Calgary & Edmonton Corp. Calgary.	Home
CULLINGHAM, E. K.	Canpet Exploration Ltd., Calgary.	Home
CUNNINGHAM, E. E.	Sinclair Canada Oil Company, Calgary.	Home
CZIMBORAY, L. L.	Can. Strat. Service Ltd., Calgary.	Home
DANN, G.	H. B. Oil & Gas Co. Ltd., Calgary.	Home
D'ARCY, D. G.	United Geophysical Co., Calgary.	Home
DAVIDSON, A. T.	Federal Government, Ottawa, Ontario.	Palliser Hotel

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DAVIES, W. E.	U. S. Geological Survey, Falls Church, Va.	Wales Hotel
DAVIS, L. F.	Atlantic Refining Co., Dallas, Texas.	
DEANE, R. E.	Dept. of Geol. Sciences, U. of Toronto, Toronto, Ontario.	Palliser Hotel
DE CAEN, R.	Triad Oil Co. Ltd., Calgary.	Home
de CIZANCOURT, H.	French Petroleum Company of Canada Ltd., Calgary.	Home
DeMILLE, G.	Imperial Oil Ltd., Calgary.	Home
DETMAR, A. O.	Mobil Oil of Canada, Ltd., Calgary.	Home
DEWIEL, J. E. F.	Ceepee Oil Co. Ltd., Calgary.	Home
DEWIT, R.	J. C. Sproule & Assoc. Calgary.	Home
DICKENS, H. B.	National Research Council, Ottawa, Ontario.	Wales Hotel
DICKIESON, P. A.	Trans-Western Oils Ltd., Calgary.	Home
DINGLE, W. B.	Imperial Oil Co. Ltd., Edmonton, Alberta.	
DOBRIN, M. B.	Triad Oil Co. Ltd., Calgary.	Home
DONNELLY, C. W.	Ohio Oil Co., Calgary.	Home
DOW, D. H.	U. S. Geological Survey, Washington, D. C.	Royal Hotel
DOWNING, J. A.	North Star Oil Limited. Calgary.	Home
DREW, C. W.	Geophoto Services Ltd., Calgary.	Home
DUNBAR, M. (Miss)	Federal Government, Ottawa, Ontario.	Palliser Hotel
DUTRO, J. T. Jr.	U. S. National Museum, Washington, D. C.	Wales Hotel
DYKSTRA, F. R.	West Canadian Oil & Gas Ltd., Calgary.	Home
EARDLEY, A. J.	University of Utah, Salt Lake City, Utah.	Palliser Hotel
EATON, R. M.	Dept. of Mines and Tech. Surveys, Ottawa, Ontario.	
EBERLEIN, G. D.	U. S. Geol. Survey, Menlo Park, California.	Wales Hotel
ECCLES, J. K.	Texaco Exploration Co., Calgary.	Home
ECKHART, R. A.	Sunray Mid-Continent Oil Co., Anchorage, Alaska.	Wales Hotel
EDWARDS, J. L.	American Overseas Petroleum Ltd., New York, N. Y.	Palliser Hotel
EDWARDS, R. G.	Texaco Exploration Co., Calgary.	Home
ELLITSGAARD-RASMUSSEN, K.	Geological Survey of Greenland, Copenhagen, Denmark.	Palliser Hotel
ERB, D.	Hunting Survey Corp., Ltd., Calgary.	Home
ERDMAN, O. A.	B. A. Oil Co., Calgary.	Home
ERICKSON, A. R.	Northern Natural Gas Prod. Co., Omaha, Nebraska.	Palliser Hotel
ERICKSON, R. H.	Great Plains Dev. Co. of Canada, Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
ETHIER, Mrs. V.	Temporarily retired, Red Deer, Alberta.	
EVANS, J. K.	University of Saskatchewan, Saskatoon, Saskatchewan.	Braemar Lodge
EWING, M.	Lamont Geol. Obs. of Columbia U. Palisades, New York.	Palliser Hotel
FALCON, N. L.	British Petroleum Co. - Triad Oil Co., London, England.	
FALCONER, W. L.	Ponder Oils Ltd., Calgary.	Home
FARMILO, A. W.	Western Leasholds Ltd., Calgary.	Home
FERGUSON, R. D.	University of Alberta. Edmonton, Alberta.	
FERREIRA, E. C.	Quebec Cartier Mining, Montreal, Quebec.	Palliser Hotel
FERRIS, C. S. Jr.	University of Saskatchewan, Saskatoon, Saskatchewan.	Royal Hotel
FITZGERALD, E. L.	Pan American Pete. Corp. Calgary.	Home
FLORIN, S. A.	University of Quaterriary, Uppsala, Sweden.	
FOLINSBEE, R. E.	University of Alberta, Edmonton, Alberta.	Palliser Hotel
FORD, M. E.	Canpet Exploration, Calgary.	Home
FOWLIE, J. D.	Accurate Exploration Co., Calgary.	Home
FRISTRUP, B.	University of Copenhagen, Kobenhavn, Denmark.	
FROMAN, J. C.	Amerada Petroleum Corp. Calgary.	Home
FUENNING, P.	Geophoto Services Ltd., Calgary.	Home
FULLER, J. G. C.	Amerada Pete. Corp. Calgary.	Home
FYFFE, L. R.	Cree Oil of Canada, Calgary.	Home
FYLES, J. G.	Geol. Survey of Canada, Ottawa, Ontario.	Palliser Hotel
GAJDA, R. T.	Dept. of Mines & Tech. Surveys, Ottawa, Ontario.	Royal Hotel
GALLAGHER, J. P.	Dome Petroleum Ltd., Calgary.	Home
GAMMELL, H. G.	Pure Oil Co., Calgary.	Home
GATENBY, L. B.	Rio Tinto Can. Exploration Co. Ltd., Vancouver, B. C.	Royal Hotel
GAUVIN, P. L.	University of B. C., Vancouver, B. C.	Braemar Lodge
GAVELIN, D. E.	Mobil Oil of Canada, Ltd., Calgary.	Home
GEISLER, C. B.	Texaco Exploration Co., Calgary.	Home
GELL, P. D. M.	Round Valley Oil Co. Ltd., Calgary.	Home
GENENSKY, S. M.	Rand Corp. Santa Monica, California.	Palliser Hotel
GEPPERT, K.	Ceepee Oil Co. Ltd., Regina, Saskatchewan.	
GERMUNDSON, R. K.	University of Alberta, Student, Edmonton, Alberta.	
GIBSON, A. B.	Amerada Petroleum Corp., Calgary.	Home

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GIBSON, H. C.	Can. Strat. Service, Calgary.	Home
GISBURNE, J. R.	Skelly Oil Company, Calgary.	Home
GLASS, D. J.	Canadian Export Gas & Oil Ltd., Calgary.	Home
GOLDAK, G. R.	University of Saskatchewan, Saskatoon, Saskatchewan.	Braemer Lodge
GOODALL, D. P.	Oil & Gas Conservation Board, Calgary.	Home
GOODING, H. O.	Imperial Oil Co. Ltd., Calgary.	Home
GOODMAN, A. J. (Dr.)	Mobil Oil of Canada, Ltd., Calgary.	Home
GOULD, D. B.	Geophoto Services Ltd., Calgary.	Home
GOULD , E. C. S.	Imperial Oil, Devon, Alberta.	Wales Hotel
GRAHAM, H. G.	Humble Oil & Refining, Anchorage, Alaska.	Palliser Hotel
GRAY, F. F.	Gulf States Oil Co., Calgary.	Home
GRAY, J. K.	Gt. Plains Dev. Co. of Canada, Ltd., Calgary.	Home
GRETENER, P. E.	Shell Oil Co., Calgary,	Home
GRIFFITHS, R. E.	University of Alberta & Union Oil Co. of California, Edmonton, Alberta.	
GRIMM, R. D.	Northern Natural Gas Co., Omaha, Nebraska.	Palliser Hotel
GRITZUK, N.	Western Minerals Ltd., Calgary.	Home
GROSSMAN, W. L.	Shell Oil of Canada, Limited, Calgary.	Home
GRYC, G.	U. S. Geological Survey, Washington, D. C.	Wales Hotel
GUSSOW, M. B. (Mrs. W. C.)		Home
GUSSOW, W. C.	A.S.P.G. Union Oil of California, Calgary.	Home
HAARMANN, H. H.	Dea Oil of Canada, Ltd., Calgary.	Home
HAAS, J. J.	Ohio Oil Co., Calgary.	Home
HAGE, C. O.		Home
HAITES, T. B.	Husky Oil & Refining, Calgary.	Home
HALBERTSMA, H. L.	Imperial Oil Ltd., Calgary.	Home
HALE, F. A.	Cal. Standard, Co., Calgary.	Home
HALE, J. D.	McPherson and Hale, Calgary.	Home
HALKOW, F. J.	Cree Oil of Canada, Calgary.	Home
HALTON, E.	Texaco Exploration Co., Calgary.	Home
HANNIGAN, K. D.	Geophoto Services Ltd., Calgary.	Home
HARDING, S. R. L.	J. C. Sproule & Assoc. Calgary.	Home
HARLOW, R. O.	Seismograph Service Corporation of Canada., Calgary,	Home

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HARRIS, G. S.	U. S. Navy Underwater Sound Laboratory, New London, Connecticut.	Palliser Hotel
HART, P. J. (Dr.)	USNC-IGY National Academy of Sciences, Washington, D. C.	Wales Hotel
HARTSHORN, J. H.	U. S. Geological Survey, Boston, Mass.	Palliser Hotel
HARTWIG, A. E.	Humble Oil & Ref., Anchorage, Alaska.	Palliser Hotel
HARVIE, E. L.	Western Minerals Ltd., Calgary.	Home
HARWOOD, T.	Defence Research Board, Ottawa, Ontario.	Palliser Hotel
HASTINGS, D. D.	Standard Oil Co. of Calif. Seattle, Washington.	Palliser Hotel
HATTERSLEY-SMITH, G.	Defence Research Board, Ottawa, Ontario.	Palliser Hotel
HAUN, G. R.	Texaco Canada Ltd., Calgary.	Home
HAWLEY, J. E.	Dept. of Geological Sciences, Queen's University, Kingston, Ontario.	Palliser Hotel
HEEZEN, B. C.	Columbia University, Palisades, New York.	Palliser Hotel
HEMSTOCK, R. A.	Imperial Oil, Calgary.	Home
HENDERSON, G. G. L.	Cal. Std. Co., Calgary.	Home
HENDRICKSON, J.	Champlin Oil & Refining Co., Calgary.	Home
HENDERSON, W. R. S.	B. A. Oil, Calgary,	Home
HERBERT, H. D.	Pacific Western Airlines Ltd., Edmonton, Alberta.	Royal Hotel
HESS, G. R.	Geophysical Associates of Canada, Ltd., Calgary.	Home
HIGHTOWER, C. H.	Atlantic Refining Co., Dallas, Texas.	
HILDENBRAND, F. A.	Atlantic Refining Co., Calgary.	Home
HILL, M. J.	Gulf Research & Dev. Co., Pittsburgh, Pennsylvania.	Palliser Hotel
HINRICHS, C. G.	Department of Army, Falls Church, Virginia.	Palliser Hotel
HIRONAKA, M.	Honolulu Oil Corp. Calgary.	Home
HITCHON, B.	Alberta Provincial Government, Edmonton, Alberta.	
HODGSON, G. W.	Research Council of Alberta. Edmonton, Alberta.	
HOKE, C. J.	Murphy Corporation, El Dorado, Arkansas.	Palliser Hotel
HOLLENBECK, L. E.	U. S. Army Map Service, Vienna, Virginia.	
HOLMES, G. W.	U. S. Geological Survey, Washington, D. C.	Palliser Hotel
HOLWAY, W.	Quebec Cartier Mining, Montreal, Quebec.	Palliser Hotel
HOMMEL, W. H.	Amerada Petroleum Corp. Calgary.	Home
HOPKINS, D. M.	U. S. Geologist Survey, Menlo Park, California.	Wales Hotel
HORNFORD, H. T.	Richfield Oil Corp. Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
HOTCHKISS, H. N.	Alcon Petroleums Ltd., Calgary.	Home
HOVDEBO, H. R.	Cal. Std. Co., Edmonton, Alberta.	
HOVER, F. B.	Amerada Petroleum Corp., Calgary.	Home
HOWARD, E. M.	Chemical & Geol. Laboratories, Calgary.	Home
HRISKEVICH, M. E.	Canadian Fina Oil Limited, Calgary.	Home
HUDSON, R. M.	Richfield Oil Corp., Calgary.	Home
HUGHSON, J. T.	Imperial Oil Ltd., Calgary.	Home
HUME, J. I.	Defence Research Board, Ottawa, Ontario.	
HUNKINS, K. L.	Lamont Geol. Observatory, Columbia, N. Y. Palisades, New York.	Palliser
HUNT, C. W.	McDougall-Hunt Consultants Ltd., Calgary.	Home
HURT, T. W.	Texas Pacific Coal, Calgary.	Home
HUPP, J. E.	Altana Exploration Co., Cut Bank, Montana.	Palliser Hotel
HUSSEY, K. M.	Iowa State University, Ames, Iowa.	Palliser Hotel
HYDE, D. L. M.	Imperial Oil Ltd., Calgary.	Home
IGNATIUS, H. G.	Geological Survey, Otaniemi, Finland.	
ILLING, L. V.	Calgary.	Home
INGALL, L. N.	British American Oil Co., Calgary.	Home
ION, D. C.	Triad Oil Co. Ltd., Calgary.	Home
IRVINE, D. S.	Texas Pacific Coal & Oil Co. Calgary.	Home
IRVINE, R. K.	Peter Bawden Drlg. Co., Calgary.	Home
IRVING, R. W.	Amerada Petroleum Corp. Calgary.	Home
IRWIN, A. B.	Indian Affairs Branch, Calgary.	Home
JACKSON, D. E.	Pan American Pete. Corp. Calgary.	Home
JACOBSEN, G.	McGill University - Dept. of Geography, Montreal, Quebec.	Palliser Hotel
JAMESON, J. A.	Ohio Oil Co., Calgary.	Home
JELETZKY, G. (J) A.	Geological Survey of Canada, Ottawa, Ontario.	Royal Hotel
JODRY, R. L.	Sun Oil Company, Billings, Montana.	
JORGENSON, J. T.	Geophoto Services Ltd., Calgary.	Home
JONES, B. C.	Canadian Superior Oil of California Ltd., Calgary.	Home
JONES, J. M.	National Academy of Sciences, Washington, D. C.	Wales Hotel
JONES, P.	Triad Oil Co., Calgary.	Home
JONES, Dr. T. O.	National Science Foundation Washington, D. C.	Palliser Hotel

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JONES, V.	Socony Mobil Oil Company Inc., Darien, Connecticut.	Palliser Hotel
JORGENSON, J. T.	Geophoto Services, Ltd. Calgary.	Home
JULL, R. K.	University of Alberta. Edmonton, Alberta.	
JUDD, W. R.	Rand Corp., Santa Monica, California.	Palliser Hotel
JUNGER, A.	Shell Oil Co., Calgary.	Home
KAMB, H. R.	Delhi-Taylor Oil Corp., Dallas, Texas.	Palliser Hotel
KARLSTROM, T. N. V.	U. S. Geological Survey, Arlington, Virginia.	Palliser Hotel
KASSUBE, J. R.	Gulf States Oil Company of Canada, Calgary.	Home
KATZ, H. R.	Empresa Nacional del Petroleo, Punta Arenas, Chile.	
KAUFMANN, W. L.	University of Saskatchewan, Saskatoon, Saskatchewan.	Braemar Lodge
KAWASE, Y.	Pan American Petroleum Corp., Calgary.	Home
KELLER, G. V.	U. S. Geological Survey, Denver, Colorado.	Palliser Hotel
KELLIHER, T. G.	Tidewater Oil Co., Los Angeles, California.	
KENT, P. E.	B. P. Exploration (Canada) Ltd., Calgary.	Home
KENTTA, H.	Sohio Pete. Corp. Calgary.	Home
KENYON, R. M.	B. A. Oil Producing Co., Anchorage, Alaska.	Palliser Hotel
KERR, S. A.	Consultant - Self employed, Calgary.	Home
KETTERER, W. P.	Sohio Petroleum Co., Oklahoma City, Oklahoma.	Royal Hotel
KIDD, S. J.	Amerada Petroleum Corp., Calgary, Alberta.	Home
KINSLEY, E. R.	Texas Instruments Inc., Dallas, Texas.	
KIRKER, R. J.	Western Decalta Petroleums, Calgary.	Home
KNEBLES, J. J. (Jr.)	Signal Oil & Gas Co., Calgary.	Home
KNIPSCHEER, H. C. G.	Ambassador Oil Corp., Calgary.	Home
KNODE, W. F. III	Medallion Petroleums, Calgary.	Home
KOCH, L.	Ministry of Greenland, Copenhagen, Denmark.	Palliser Hotel
KOHLER, W. F.	U. of Washington, Terrace, Washington.	
KOLODY, G. R.	Medallion Petroleums Ltd., Calgary.	Home
KRALIS, D. F.	Clark Oil & Refining Corp., Denver, Colorado.	Palliser Hotel
KRANCK, E. H.	McGill University, Montreal, Quebec.	Palliser Hotel
KRAUSE, G. G.	Can. Kewanee Ltd., Calgary.	Home
KRINSLEY, D. B.	Permafrost Section, U. S. Geological Survey Washington, D. C.	Wales Hotel

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KROGER, A.	McGill University - Rand Corp., Montreal, Quebec.	Palliser Hotel
KRYCKA, A. W.	Pan American Petroleum Corp., Edmonton, Alberta.	
KROON, H. M.	Texaco Exploration Co., Calgary.	Home
KUENZI, L. M.	Standard Oil Co. of California. Seattle, Washington.	Palliser Hotel
KUGLER, H. W.	Britalta Petroleums Ltd., Calgary.	Home
KUNST, H.	Imperial Oil Limited, Calgary.	Home
KUPSCH, W. O.	University of Saskatchewan Saskatoon, Saskatchewan.	Palliser Hotel
LAATSCH, H. K.	Can. Superior Oil of Calif. Calgary.	Home
LABADY, F.	Can. Strat. Service Ltd., Calgary.	Home
LACHENBRUCH, A. H.	U. S. Department of Interior, Geological Survey, Palo Alto, California.	Palliser Hotel
LACKIE, J. H.	Amerada Petroleum Corp., Calgary.	Home
LAILEY, C. F.	Canadian Oil Companies Ltd., Calgary.	Home
LAKEMAN, R.	Triad Oil Co. Ltd., Calgary.	Home
LAURENCE, R. H.	Supertest Petroleum Corp. Calgary.	Home
LAYER, D. B.	Imperial Oil Ltd., Calgary.	Home
LEGGET, R. F.	National Research Council, Ottawa, Ontario.	Palliser Hotel
LEPINE, F. H.	Union Oil of Calif. Edmonton, Alberta.	Palliser Hotel
LEPPER, M. G. S.	Canadian Oil Companies Ltd., Calgary.	Home
LESKIW, K.	University of Alberta, Edmonton, Alberta.	
LIAN, H. M.	Union Oil Co. of California. Anchorage, Alaska.	Wales Hotel
LICHTENBELT, J. H.	Richfield Oil Corp., Calgary.	Home
LINCKENS, W. M. T.	Union Oil of California, Calgary.	Home
LINES, F. G.	Cal. Standard. Co, Calgary.	Home
LINK, T. A.	Cree Oil of Canada '58, Ltd., Calgary.	Home
LLOYD, G. V.	J. C. Sproule & Assoc. Calgary.	Home
LORANGER, D.	Imperial Oil Co. Ltd., Calgary.	Home
LOKHOVA, T. F.	Geology Research Institute, Moscow, Russia.	Palliser Hotel
LORD, C. S.	Geological Survey of Canada, Ottawa, Ontario.	Palliser Hotel
LUNDBERG, H. (Dr.)	Lundberg Explorations Ltd., Toronto, Ontario.	
MADDISON, H. C. B.	Field Title Service Ltd., Calgary.	Home
MAGNUSSON, D.	Mobil Oil of Canada, Dawson Creek, B. C.	

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
MALLORY, R . W.	Champlin Oil & Refining Co., Calgary.	Home
MANSON, G. R. A.	J. C. Sproule & Assoc. Calgary.	Home
MARKOV, F. G.	Institute of Geology, Leningrad, Russia.	Palliser
MARTIN, L. J.	Independent, Calgary.	Home
MARTIN, R.	Shell Oil Company of Canada, Ltd., Calgary.	Home
MARTISON, N. W.	Colorado Oil & Gas Ltd., Calgary.	Home
MASON, J. D.	Transcontinental Resources, Bralsma Pete. Vancouver, B. C.	Palliser Hotel
MATTHEIS, E.	Eskimo Fracturing & Well Servicing Ltd., Calgary.	Home
MAWDSLEY, J. B.	Geology Dept. - U. of Saskatchewan, Saskatoon, Saskatchewan.	
MEADE, G.	Union Oil of Calif. Calgary.	Home
MEADOR, J. G.	Accurate Exploration Ltd., Calgary.	Home
MEECH, H. W.	Western Minerals Ltd., Calgary.	Home
MENELEY, R. A.	Imperial Oil Ltd., Dawson Creek, B. C.	Royal Hotel
MICHAELIS, E. R.	Pan American Petroleum Corp., Calgary.	Home
MICKEY, R. J.	Phillips Petroleum Company, Calgary.	Home
MIEDEMA, O.	University of Saskatchewan, Saskatoon, Saskatchewan.	Braemar Lodge
MILLER, H. S.	Royalite Oil Co., Calgary.	Home
MILLER, M. M.	Michigan State University, East Lansing, Michigan.	Palliser Hotel
MINICK, J. N.	Atlantic Refining Co., Calgary.	Home
MOLLOY, A. E.	U. S. Navy Hydrographic Office, Washington, D. C.	Wales Hotel
MOONEY, A. R.	U. S. Navy Hydrographic Office, Washington, D. C.	
MOORE, C. F. Jr.	Sohio Petroleum Co., Billings, Montana.	Palliser Hotel
MOORE, W. B.	Atlantic Refining Co., Dallas, Texas.	
MOOREHOUSE, M. D.	Mobil Oil of Canada, Dawson Creek, B. C.	Royal Hotel
MORRIS. L. (W.) G.	Seismograph Service Corp. of Canada, Calgary.	Home
MOYER, G. L.	Ohio Oil Co., Calgary.	Home
MUNYAN, A. C.	Sohio Petroleum Co., Billings, Montana.	Wales Hotel
MURRAY, J. W.	Texaco Exploration Co., Calgary.	Home
MUSTARD, G. A.	The Ohio Oil Co., Findlay, Ohio.	Palliser Hotel
MYGDAL, K. A.	Pure Oil Company, Calgary.	Home
MacDONALD, J. S.	Atlantic Refining Co., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
MACDOUGAL, D. E.	Sunray Oil Co., Calgary.	Home
MACGREGOR, J. D.	Imperial Oil Limited, Toronto, Ontario.	Palliser Hotel
MACKAY, J. R.	Dept. of Mines & Tech. Survey of Ottawa, Vancouver, B. C.	Palliser Hotel
MACKENZIE, A. G.	J. C. Sproule & Assoc. Calgary.	Home
MACKENZIE, J. R.	Independent, Calgary.	Home
MACKENZIE, W. D. C.	Imperial Oil Ltd., Calgary.	Home
MACLEAN, W. V.	Canadian National Railway, The Pas, Manitoba.	Royal Hotel
MACLEOD, B.	Hunting Survey Corp., Calgary.	Home
MACLEOD, Miss F.	Calgary Public Library, Calgary.	Home
MACNEIL, F. S.	U. S. Geological Survey, Menlo Park, California.	Palliser Hotel
MCADAM, K. A.	Skelly Oil Co., Calgary.	Home
MCCAIN, H. Jr.	Atlantic Refining Co., Calgary.	Home
MCCAFFREY, J. B.	Ohio Oil Company, Calgary.	Home
MCCASLAND, B. C.	Canada-Cities Service Pete. Corp. Calgary.	Home
MCCONVILLE, R. J.	Signal Oil & Gas Co., Calgary.	Home
MCCORD, C. D.	Cree Oil of Canada, Calgary.	Home
MCCROSSAN, R. G.	Imperial Oil Ltd., Calgary.	Home
MCDERMOTT, A. A.	British American Oil Co., Calgary.	Home
MCGILL, P. C.	Imperial Oil Limited, Calgary.	Home
MCGINN, R. G.	Mobil Oil of Canada, Ltd. Calgary.	Home
MCGUGAN, A.	Consultant, Calgary.	Home
MCKINNON, F. A.	Triad Oil Co., Calgary.	Home
MCLEOD, M. E.	Can. Strat. Service Ltd., Calgary.	Home
MCNAIR, A.	Dept. of Geology, Dartmouth College, Hanover, N. Hamp. U. S. A. & Dominion Explorers Ltd., Toronto.	Palliser Hotel
MCNAMEE, J. J.	Champlin Oil & Refining Co., Calgary.	Home
NAYUDU, Miss R. Y.	University of Washington, Seattle, Washington.	Wales Hotel
NEEDHAM, N. G.	Western Minerals Ltd. Calgary.	Home
NEEDLEMAN, S. M.	Federal Govt. - Dept. of Defense, Bedford, Mass.	Palliser Hotel
NEEL, H. H.	Tidewater Oil Co., Los Angeles, California.	
NELSON, K. H.	Amerada Petroleum Corp. Calgary.	Home
NELSON, R. B.	Sproule & Assoc. Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
NESS, P. A.	University of Alberta. Edmonton, Alberta.	
NEWLAND, J. B.	None Calgary.	Home
NEWMAN, W. R.	International Oil Services Ltd., Toronto, Ontario.	Wales Hotel
NEWMARCH, C. B.	French Petroleum Co. of Canada Ltd., Calgary.	Home
NEWTON, D. C. Mrs.	- Calgary.	Home
NICHOLS, D. R.	U. S. Geological Survey, Washington, D. C.	Palliser Hotel
NOBLES, L. H.	Northwestern University, Evanston, Ill.	Palliser Hotel
NORFORD, B.	Shell Oil Co. of Canada, Ltd. Calgary.	Home
NORGAARD, G. A.	Ohio Oil Co., Calgary,	Home
NORTH, R. B.	University of Saskatchewan, Saskatoon, Saskatchewan.	
O'GORMAN, A. J.	Hunting Associates Ltd., Calgary.	Home
OLSON, Mrs. B.	- Calgary.	Home
OLSON, K.	Phillips Petroleum Company, Calgary.	Home
O'SULLIVAN, J. B.	Iowa State University, Ames, Iowa.	Palliser Hotel
OSWALD, D. H. (Dr.)	Cal. Std. Co., Edmonton, Alberta.	
OWEN, E.	- San Antonio, Texas.	Palliser Hotel
PAGE, R. J.	Seismograph Service Corp. of Canada, Calgary.	Home
PALLAT, R. E.	Imperial Oil Ltd., Calgary,	Home
PALLISTER, A. E.	Accurate Exploration Ltd., Calgary.	Home
PARKS, T.	Sohio Petroleum Co., Calgary.	Home
PARKS, T.	Selco Exploration Company Ltd., Toronto, Ontario.	Royal Hotel
PARSONS, K. R.	Home Oil Co., Ltd., Calgary.	Home
PARSONS, W. H.	Calif. Standard Co., Edmonton, Alberta.	
PASKEVICH, S.	Triad Oil Co. Ltd., Calgary.	Home
PATTERSON, J. R.	Amerada Petroleum Corp. Calgary.	Home
PATTERSON, S. O.	United Geophysical Corp. Houston, Texas.	Palliser Hotel
PATTERSON, W. H.	Trans-Western Oils Ltd., Calgary.	Home
PAWSON, K.	Canadian Engineering Surveys Ltd., Calgary.	Home
PEAVEY, R. C.	National Accademy of Sciences, Washington, D. C.	
PEARSON, S. G.	British American Oil Co., Calgary.	Home
PECKHAM, L.	Eldorado Mining & Refining Co., Okotoks, Alberta.	
PELZER, E. E.	Cal. Std. Co., Edmonton, Alberta.	

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
PENNER, D. G.	Consulting Geologist, Calgary.	Home
PERRY, R. B.	University of Washington, Seattle, Washington.	Palliser Hotel
PETERSON, N. N.	J. C. Sproule & Assoc. Calgary.	Home
PIAZZA, P.	Hunting Survey Corp. Calgary.	Home
PLATT, R. L.	Dept. of Geology - U. of Alberta. Edmonton, Alberta.	
PLOUFF, D.	U. S. Geological Survey, Denver, Colorado.	Palliser Hotel
POTTER, D. M.	Foundation for Glacier Research Inc. Union, New Jersey.	
POWELL, J. M.	Forest Biology Div. - Dept. of Agriculture, Calgary.	Home
POYEN, J. S.	Imperial Oil Ltd., Calgary.	Home
PRINGLE, G. H.	Ohio Oil Co., Calgary.	Home
PROUTY, C.	Michigan State University, East Lansing, Michigan.	
PURDY, G. A.	Imperial Oil Ltd., Toronto, Ontario.	
RAASCH, G. O.	Shell Oil Company, Calgary,	Home
RABKIN, M. I.	Institute of Geology, Leningrad, Russia.	Palliser Hotel
RAINSBERRY, L. E.	University of Saskatchewan, Saskatoon, Saskatchewan.	
RAPSON, J. E.	Shell Oil Co. of Canada Ltd., Calgary.	Home
REASONER, M. A.	Canada Southern Petroleum Calgary.	Home
RECORD, W.	Richfield Oil Co., Los Angeles, California.	Palliser Hotel
REDMOND, J. J.	Ohio Oil Co., Calgary.	Home
REED, J. C.	U. S. Geological Survey. Washington, D. C.	Palliser Hotel
REECE, A.	J. C. Sproule & Assoc. Calgary.	Home
REED, P. C.	Can. Strat. Service, Calgary.	Home
REDFORD, M. S.	Canadian Aero Service Ltd., Ottawa, Ontario.	
RENAUD, J. E.	Consulting Geologist, Calgary.	Home
RENFRO, K. M.	Atlantic Refining Co., Dallas, Texas.	
REPO, R. A.	Geological Survey, Otaniemi, Finland.	
RICHARDS, T. C.	Triad Oil Co. Ltd., Calgary.	Home
RIGBY, J. K.	Pan American, Calgary.	Home
ROBBINS, B. P.	University of Alberta. Edmonton, Alberta.	
ROBERTSON, G. R.	Canadian Oil Companies Ltd., Calgary.	Home
ROBINSON, D. B.	Union Oil of California, Anchorage, Alaska.	Wales Hotel
ROED, M. A.	University of Saskatchewan, Saskatoon, Saskatchewan.	Braemar Lodge

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ROETHLISBERGER, H.	U. S. Army - Ice & Permafrost Research, Est., Evanston, Ill.	Palliser Hotel
ROGERS, A. R.	Ceepee Oil Co., Regina, Saskatchewan.	Wales Hotel
ROOTS, E. F.	Dept. of Mines & Tech. Surveys, Ottawa, Ontario	Wales Hotel
ROSS, J. V.	University of B. C. Vancouver, B. C.	
ROSS, R. B.	B. A. Oil Co. Limited Calgary.	Home
ROWLEY, G. W.	Dept. of Northern Affairs & National Resources. Ottawa, Ontario.	
RUDKIN, R. A.	Imperial Oil Limited Calgary.	Home
RUSSELL, O. R.	V. Zay Smith Assoc. Calgary.	Home
RUSSELL, W. A.	Triad Oil Co. Ltd., Calgary.	Home
RYAN, B. G.	Texaco Canada Limited, Calgary.	Home
SAKS, V. N.	Institute of Geology Leningrad, Russia.	Palliser Hotel
SAMPSEL, W. H.	Amerada Pet. Corp., Calgary.	Home
SAVAGE, P. J.	Nance Exploration Ltd., Calgary.	Home
SCHAU, M.	Bowness Central High - Student Bowness, Alberta.	Home
SCHENK, E. (Dr.)	(Geolog. Survey of Hessen) Giessen, Germany.	
SCHERP, H. S.	V. Zay Smith Assoc. Calgary.	Home
SCHOLL, D.	U. S. Geological Survey, Palo Alto, Calif.	Royal Hotel
SCHOONMAKER, G. R.	The Ohio Oil Company, Findlay, Ohio.	Palliser Hotel
SCHROTT, P. H.	Shell Oil Co. of Canada Ltd. Calgary.	Home
SCHWARZACHER, W.	Queen's University, Belfast, Ireland.	
SCOTT, J. C.	Husky Oil & Refining Ltd., Calgary.	Home
SCOTT, P. B.	Stone & Webster Canada Ltd., Toronto, Ontario.	
SCOTT, R. D.	Imperial Oil Ltd., Calgary, Alberta.	Home
SEAMAN, D. R.	Seaman Engineering & Drilling Co. Ltd., Calgary.	Home
SEHNERT, H. G.	Sohio Pete. Co., Calgary.	Home
SHEASBY, N. M.	Canadian Stratigraphic Service Ltd., Calgary.	Home
SHIMEK, E. J.	Geophysical Associates, Houston, Texas.	
SIBLEY, J. O.	Medallion Petroleums Limited, Calgary.	Home
SIEBENS, W. W.	Siebens Leaseholds Ltd., Calgary.	Home
SIM, V. W.	Dept. of Mines and Tech. Surveys, Ottawa, Ontario.	Wales Hotel
SIMONSON, R. R.	The Ohio Oil Co., Los Angeles, Calif.	Palliser Hotel
SINCLAIR, A. J.	University of B. C., Vancouver, B. C.	

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SKEELS, D. C.	Imperial Oil Ltd., Calgary.	Home
SMAILES, M. G.	Brett Oil & Gas, Calgary.	Home
SMILEY, C. J.	Macalester College, St. Paul, Minnesota.	Palliser Hotel
SMITH, D. D.	Louisiana State University, Baton Rouge, Louisiana.	Royal Hotel
SMITH, D. G. W.	University of Alberta. Edmonton, Alberta.	
SMITH, W. R.	Texas Pacific Coal & Oil, Calgary.	Home
SNEDDEN, L. B.	Signal Oil and Gas Company, Los Angeles, Calif.	Palliser Hotel
SOLLARS, P. F.	- Anchorage, Alaska.	Palliser Hotel
SORGE, B. W.	United Geophysical Corp. Pasadena, Calif.	Wales Hotel
SPARROW, R. E.	Peter Bawden Drilling Limited, Calgary.	Home
SPIVAK, J. (Dr.)	Mobil Oil of Canada, Ltd. Calgary.	Home
SPRINGER, G. D.	Union Oil Co. of California., Calgary.	Home
SPROULE, J. C.	J. C. Sproule and Assoc. Calgary.	Home
SQUAIR, H.	University of Saskatchewan, Saskatoon, Sask.	Braemar Lodge
STACKLER, W. F.	Consulting Geophysicist, Calgary.	Home
STANSBERRY, G. F.	Pan American Pete. Corp. Edmonton, Alberta.	
STANTON, M. S.	The California Standard Company, Calgary.	Home
STAUFFER, M. R.	University of Alberta, Edmonton, Alberta.	
STELTNER, H. A. R.	Steltner Dev. and Manuf. Co. Ltd., St. Catharines, Ontario.	Royal Hotel
STEWART, H. J.	Pan American Petroleum Corp., Edmonton, Alberta.	
STEWART, S.	Richfield Oil Corp., Calgary.	Home
ST-ONGE, D. A.	Dept. of Mines & Tech. Surveys, Ottawa, Ontario.	
STRATH, J. W.	Canadian Aero Service Ltd., Ottawa, Ontario.	Palliser Hotel
STROYBERG, P.	J. Lauritzen, Shipowner, Copenhagen, Denmark, Quebec, P. Q.	Palliser Hotel
STUART, Dr. R. S.	The California Standard Co., Edmonton, Alberta.	Wales Hotel
SUTER, H. H.	Texaco Explor. Co., Calgary.	Home
SUTHERLAND, D. R.	Canadian Engineering Surveys, Ltd., Calgary.	Home
SUTTON, E. E.	Geophysical Service International Corp., Calgary.	Home
SWANSON, C. R.	Ohio Oil Co., Calgary.	Home
SWINZOW, Dr. G. K.	U. S. Army Corps of Engineers, Willmette, Illinois.	Palliser Hotel
SYKES, D. W.	University of Saskatchewan, Saskatoon, Sask.	Braemar Lodge

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TASSONYI, E. J.	Calgary.	Home
TAYLOR, N. W.	Honolulu Oil Corp., Calgary.	Home
TAYLOR, R. S.	University of Alberta, Edmonton, Alberta.	
TESKEY, M. F.	Britalta Petroleums Ltd., Calgary.	Home
TEXACO EXP. CO.,	Texaco Exploration Co., Calgary.	Home
TEXACO EXP. CO.,	Texaco Exploration Co., Calgary.	Home
THOMAS, A. N.	British Petroleum Co., London, England.	
THOMAS, J. G.	Imperial Oil Ltd., Calgary.	Home
TOMLINSON, A. G.	Imperial Oil Ltd., Dawson Creek, B. C.	Royal Hotel
THOMS, B. H. J.	Dept. of Northern Affairs & National Resources, Calgary.	Home
THORNTON, E. B.	Ottawa Silica Company, Ottawa, Illinois, U. S. A.	Palliser Hotel
THORSTEINSSON, R.	Geological Survey of Canada, Ottawa, Ontario.	Palliser Hotel
TIMM, B. C.	Sunray Mid-Continent Oil Co., Tulsa, Oklahoma.	
TISDALE, E. E.	Cities Service Oil Company, Bartlesville, Oklahoma.	
TODD, R. C.	Skelly Oils Co., Calgary.	Home
TOMILIN, M. M.	Devon Palmer Oils, Regina, Sask.	Wales Hotel
TOMPKINS, G. A.	Accurate Exploration Ltd., Calgary.	Home
TOPLEY, W. E.	Western Leaseholds Ltd., Calgary.	Home
TOWNLEY, J. L. III	Mobil Oil of Canada, Ltd., Calgary.	Home
TOZER, E. T.	Geological Survey of Canada, Ottawa, Ontario.	Palliser Hotel
TUDDENHAM, S. F.	Cree Oil of Canada (1958) Ltd., Calgary.	Home
VAN DER MEULEN, H. R.	Accurate Exploration Ltd., Calgary.	Home
TURNER, M. D.	National Science Foundation, Washington, D. C.	Palliser Hotel
VALLAT, E. H.	E. H. Vallat Ltd., Calgary.	Home
VAN HEES, H.	Canadian Stratographic Service, Calgary.	Home
VAN WART, D. D.	Geophoto Services, Ltd., Calgary.	Home
VIALOV, O.	Geological Institute Academy of Science of Uurainian SSR. Lvov, Russia.	Palliser Hotel
VIGRASS, L. W.	Imperial Oil Limited, Calgary.	Home
VUORI, H. F.	International Nickel Co. of Canada, Limited	Wales Hotel
WALASKO, J. T.	University of Alberta, Calgary.	Home
WALKER, D. J.	Triad Oil Co. Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
WALKER, H. J.	Office of Naval Research, Washington, D. C.	Palliser Hotel
WALLIS, W. E.	Standard Oil of New Jersey, New York, N. W.	
WALLER, M.	Pan American Petroleum Corp., Calgary.	Home
WARBURTON, A. F.	Selco Exploration Co. Ltd., Toronto, Ontario.	Palliser Hotel
WARTERS, R. H.	University of Alberta, Edmonton, Alberta.	
WATANABE, R. Y.	University of Alberta, Edmonton, Alberta.	
WEBER, J. R.	Defence Research Board, Ottawa, University of Alberta, Edmonton.	Royal Hotel
WETHERILL, J. K.	Kewanee Oil Co., Tulsa, Oklahoma.	Palliser Hotel
WHITE, G. P. E.	J. C. Sproule & Associates, Calgary.	Home
WHITE, R. J.	Canadian Oil Companies, Ltd., Calgary,	Home
WILL, Dr. H. J.	Dea Oil of Canada Ltd., Calgary.	Home
WILLIAMS, E. P.	H. B. Oil and Gas Co. Limited, Calgary.	Home
WILLIAMS, F. J.	Consumers' Co-operative Refineries Ltd., Saskatoon, Sask.	
WILLIAMS, G. D.	University of Alberta, Edmonton, Alberta.	
WILLIS, R. B. (Jr.)	Jefferson Lake Petrochemicals of Canada Ltd., Calgary.	Home
WILLIS, R.	Consultant, Inglewood, Calif.	Palliser Hotel
WILLGING, W. E.	Geophoto Services, Ltd., Calgary.	Home
WILSON, G. A.	J. C. Sproule & Assoc. Calgary.	Home
WILSON, H. D. B.	University of Manitoba, Winnipeg, Manitoba.	Wales Hotel
WILSON, H. P.	Department of Transport, Canada, Edmonton, Alberta.	Royal Hotel
WILSON, J. T.	University of Toronto, Toronto, Ontario.	Palliser Hotel
WINSLOW, A. C.	Humble Oil & Refining Co., Anchorage, Alaska.	Palliser Hotel
WINSNES, T. S.	Norsk Polarinstitutt, Oslo, Norway.	Palliser Hotel
WISE, R. A.	Sunray Mid-Continent Oil Co., Tulsa, Oklahoma.	
WISSNER, U. F. G.	Union Oil Co. of California, Calgary.	Home
WOMACK, B. T.	Clark Oil and Refining Corp., Denver, Colorado.	
WOODHEAD, M.	French Petroleum Co. of Canada Ltd., Calgary.	Home
WOODMAN, J. C.	University of Alberta, Edmonton, Alberta.	
WOODWARD, H. W.	British American Oil Co., Calgary.	Home
WORKMAN, L. E.	Canadian Strat. Service Ltd., Calgary.	Home
WORKUM, R. H.	J. C. Sproule & Assoc. Calgary.	Home

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WRIGHT-BROUGHTON, C.	Hunting Survey Corp. Ltd., Calgary.	Home
WUEST, W. F.	Western Minerals Ltd., Calgary.	Home
YOLE, R. W.	University of B. C., Vancouver, B. C.	Braemar Lodge
YONT, D. R.	Texaco Exploration Co., Calgary.	Home
YOUNG, H. R.	Hudson's Bay Oil & Gas Co. Ltd., Calgary.	Home
YOUNG, R. O.	Texaco Canada Limited, Calgary.	Home
ZATURECKY, J. W.	University of Alberta, Edmonton, Alberta.	
ZEDERAYKO, E. E.	University of Saskatchewan, Saskatoon, Sask.	
ZELL, R. L.	Amerada Petroleum Corp., Calgary.	Home
ZUMBERGE, Dr. J. H.	University of Michigan, Ann Arbor, Michigan.	

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ON

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SUPPLEMENTARY LIST

This list of Delegates is being supplied to all Registrants with the hope that all may find it a useful reference.

This supplement, together with the original list which was supplied to all delegates when they registered, is a complete list of the Registrants at the Symposium through Monday noon, January 11, 1960.

CALGARY, ALBERTA, CANADA.

January 11, 1960.

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ACHESON, C.H.	Imperial Oil Limited Calgary.	Home
ADAIR, H.	R. Adair Oil Mgt., Calgary.	Home
ADSHEAD, J. D.	Student - U. of Alberta. Edmonton, Alberta.	
AGEE, F.	United Geophysical Corp., North American Mgr., Pasadena, Calif.	
AGEY, C. S.	Amerada Petroleum Corp., Calgary.	Home
AGNEW, G. C.	Imperial Oil Ltd., Calgary.	Home
AIZENMAN, M. L.	University of Alberta - Student Calgary.	Home
ALLAN, J. F.	Tennessee Gas & Oil Co., Calgary.	Home
ALLEN, W. H.	Shell Oil Co., Calgary.	Home
AMBLER, J. S.	Sohio Petroleum Co., Calgary.	Home
ANDRICHUK, J. M.	Consulting Geologist Calgary.	Home
ARGY, G. H.	Oil Field Engineering Services Ltd., Edmonton, Alberta.	
ARMSTRONG, A. C.	The British American Oil Co. Ltd., Calgary.	Home
ARMSTRONG, N. J.	Spartan Air Services Ltd., Calgary.	Home
ARNESON, A. A.	Westcoast Transmission Co. Ltd., Calgary.	Home
AYDIN, M.	M. Aydin Ltd., Calgary.	Home
BAEKELAND, R. R.	Texaco Exploration Co., Calgary.	Home
BAHAN, W. G.	Sun Oil Company, Calgary.	Home
BAINES, J. A.	Bank of Montreal, Oil & Gas Dept., Calgary.	Home
BALOGH, S.	French Petroleum Co. of Canada, Calgary.	Home
BARKELL, C. A.	Shell Oil Co., Seattle, Washington.	
BARTON, R. H.	Geophoto Services Ltd., Calgary.	Home
BARTSCH, J. J.	Student - U. of Alberta, Calgary.	Home
BASSETT, H. G.	Shell Oil Co. of Canada Ltd., Edmonton, Alberta.	
BAYKAL, O.	Union Oil Co. of California, Calgary.	Home
BEARD, D. E.	Home Oil Co. Ltd., Calgary.	Home
BEBENSEE, L. W.	Canadian Superior Oil of California Ltd., Calgary.	Home
BELOT, R. E.	B. A. Oil Co., Calgary.	Home
BELYEA, H. R.	Geological Survey of Canada, Calgary.	Home
BERG, C. A.	Sinclair Canada Oil Co., Regina, Sask.	
BEST, M. M.	Sun Oil Company, Calgary.	Home
BEVERIDGE, A. J.	Canberra Oil Co., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
BINNING, R. L.	General Petroleums Drilling Co. Calgary	Home
BIRD, R. J.	Geology Student, U of A Calgary	Home
BISSOTT, K. R.	Fargo Oils Ltd. Calgary	Home
BLANCHET, P. H.	Consultant Geologist Calgary	Home
BLASKOVITS, V. M.	Geology Student, U. of A. Calgary	Home
BLESCH, Robt.	Aero Service Corp. Alexandria, Va.	
BLOTT, A. J.	Sun Oil Co. Calgary	Home
BOSS, Francis E.	Century Geophysical Corpn. of Canada, Calgary	Home
BOSSORT, D. O.	Woodley Canadian Oil Co. Calgary	Home
BOUTWELL, D. C.	Johnston Testers Ltd. Calgary	Home
BOWES, G. H.	A.S.P.G. Hudson's Bay O & G Ltd. Calgary	Home
BRAGG, John	Student, U. of A. Standard, Alta.	
BRILLON, K. A.	Student, U. of A. Edmonton, Alta.	
BROWN, J. S.	Husky Oil & Ref. Ltd. Calgary	Home
BROWN, R. C.	Dynamic Petroleum Products Ltd. Calgary	Home
BRYANT, A. C.	Dome Petroleum Ltd. Calgary	Home
BUCKLAND, R. S.	Gallup Buckland & Farney Calgary	Home
BUDD, R. C. M.	Security Freehold Petroleums Ltd. Calgary	Home
BUDEICKY, N. G.	Student, U. of A. Calgary	Home
BULLOCK, D. B.	D.Bruce Bullock & Associates Ltd. Calgary	Home
BUNTING, R. S.	Geologist Calgary	Home
BURCH, B. C.	Union Oil Co. of Calif. Calgary	Home
BURNS, Russ	Union Oil Co. of Calif. Calgary	Home
BURWASH, R. A.	Dept. of Geology, U. of A. Edmonton	
CALDWELL, C. K.	British American Oil Co. Ltd. Calgary	Home
CAMERON, B. E. B.	Student, U. of A. Edmonton	
CARLETON, A. T.	Zapata Pet. Corp. Midland, Texas	
CAMPBELL, K. W.	Sun Oil Co. Calgary	Home
CEHA, H. B.	Student, Amsterdam, Holland Calgary, Alberta	Home
CHAMNEY, T. P.	Shell Oil Co. of Canada Ltd. Calgary	Home
CHANDRA, D. K.	Oil & Nat.Gas Comm. Govt. of India Calgary	Home
CHAPMAN, C. J.	Imperial Oil Ltd. Calgary	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
CHARLESWORTH, H. A. K.	University of Alberta, Edmonton, Alberta.	
CHENEY, J. R.	Shell Oil Co., Seattle, Washington.	
CHERRY, J. W.	Company Geologist, Calgary.	Home
CHILDS, F.	Gulf States Oil, Calgary.	Home
CHOQUETTE, A. L.	Sinclair Canada Oil Company, Calgary.	Home
CHOQUETTE, G. B.	Stratigraphical Consultant, Calgary.	Home
CHRISTIE, R.	Geological Survey of Canada, Ottawa, Ontario.	
CHURKO, F. J.	Aero Service Ltd., Vancouver, B. C.	
CLARK, E.	Sinclair Canada Oil Co., Calgary.	Home
CLARK, L. M.	Pacific Petroleums Ltd., Calgary,	Home
CLEVELAND, C.	Pacific Petroleums Ltd., Calgary.	Home
COCHRANE, B. D.	Trans Canada Pipe Lines Ltd., Calgary.	Home
CONNICK, T. F.	Texaco Canada Ltd., Calgary.	Home
COPLAND , A. B.	Shell Oil Co. of Canada Ltd., Edmonton, Alberta.	
CORDEN, B. B.	Canadian Fina Oil Limited, Calgary.	Home
COREY, B.	Self employed Engineer, Calgary.	Home
COSGROVE, D. T.	Union Oil Co. of Calif., Calgary.	Home
COTE, P. E.	Imperial Oil Limited, Calgary.	Home
COWPER, N. W.	Tennessee Gas & Oil Co., Calgary.	Home
CRADDOCK, W. N.	Tidewater Oil Co., Calgary.	Home
CRAIG, B. G.	Geological Survey of Canada, Ottawa, Ontario.	Palliser Hotel
CRAWFORD, G. L.,	Western Minerals Ltd., Calgary.	Home
CROOK, Dr. K. A. W.	University of Alberta, Edmonton, Alberta.	
CUFF, D. J.	Gallup, Buckland & Farney - Geologists, Calgary.	Home
CULDHAM, P. V.	University of Alberta, Edmonton, Alberta.	
CUMMINGS, H. W.	Imperial Oil Ltd., Edmonton, Alberta.	
CUMMING, L. W.	Phillips Petroleum Co., Calgary.	Home
CUNDILL, Dr. J. R.	Scurry - Rainbow Oil Co., Calgary.	Home
CURR, R. L.	U. of Alberta - Student, Calgary.	Home
CUTHBERTSON, J. R.	Sinclair Canada Oil Company, Calgary.	Home
DANIEL, R. E.	The California Standard Co., Calgary.	Home
DAVIS, A. J.	University of Alberta - Student, Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
DARLING, G. B.	Imperial Oil Ltd. Dawson Creek, B. C.	
DAVIS, D. W.	Midwest Oil Corp. Calgary	Home
DAVIS, R. E.	Farney Exp. Co. Ltd. Calgary	Home
deBLICQUY, R. M.	Bradley Air Services Carp, Ontario	
DELORMS, D. L.	U. of Saskatchewan Saskatoon, Sask.	
DESMOND, J. M.	Western Geophysical Co. of Can.Ltd. Calgary	Home
DEUTSCH, E. R.	Imperial Oil Ltd. Calgary	Home
DEWAR, S. W.	Dept. of Transport Edmonton, Alta.	
DICKEY, R. I.	Texas Pacific Coal & Oil Co. Ft. Worth, Texas	
DISTURNAL, R. C.	Tennessee Gas & Oil Co. Calgary	Home
DOBRIN, S.	Geologist Calgary	Home
DOBSON, H. H.	Student, U. of A. Calgary	Home
DOERINGSFELD, W. W. Jr.	Doeringsfeld, Amuedo & Ivey Denver 3, Colorado	
DOLINSKY, E. S.	Student, U. of A. Edmonton, Alta.	
DONAIS, R.	British American Oil Calgary	Home
DONOVAN, P. R.	Student, U. of A. Calgary	Home
DOUGLAS, R. J. W.	Geologist, Ottawa, Ont.	
DOW, W. H.	British American Oil Co. Calgary	Home
DRUMMOND, B.	Perma Gas & Oil Calgary	Home
EADIE, Miss D. A.	British American Oil Calgary	Home
EDIE, R. W.	Andrichuk & Edie Calgary	Home
EDWARDS, Thos. A.	British American Oil Prod. Co. Dallas, Texas	
ELIAS, Wm. H.	Richfield Oil Corp. Calgary	Home
ELLARD, H. R.	Imperial Oil Ltd. Calgary	Home
ENGLISH, J. J.	Skelly Oil Co. Calgary	Home
ESCHER, E. F.	BPM (Shell) The Hague, The Netherlands	
EVANS, A.	Calgary & Edmonton Corp. Calgary	Home
EVANS, C. R.	Student, U. of A. Edmonton, Alta.	
FARRAND, Wm. R.	U. of Michigan Ann Arbor, Mich.	
FENTON, E. W.	Sun Oil Calgary	Home
FERREIRA, E. C.	Quebec Cartier Mining Co. Port Cartier, Quebec	
FINCH, V. W.	Shell Oil Co. Remton, Wash.	

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
FINER, R. K.	Northern Nat. Gas Prod. Co. Calgary	Home
FISCHBUCH, N. R.	Phillips Petroleum Co. Calgary	Home
FLEMING, J. B.	Welex of Canada Ltd. Calgary	Home
FLEISCHMAN, S.	Devon Palmer Oils Ltd. Calgary	Home
FLETCHER, G. L.	Richfield Oil Corp. Calgary	Home
FLEWITT, W. E.	Imperial Oil Ltd. Edmonton, Alta.	
FONG, Geo.	Home Oil Co. Calgary	Home
FRANKLIN, J. H.	Colorado Oil & Gas Ltd. Calgary	Home
FRANKOVITCH, C. S.	United Geophysical Co. of Canada Edmonton, Alta.	
FRANTZ, R.	V. Zay Smith Associates, Ltd. Calgary	Home
FRASER, J. A.	Geological Survey of Canada Ottawa, Ont.	
FREBOLD, F.	Shell Oil Co. of Canada Edmonton	
FRISCHKNECHT, F. C.	US-GS Denver, Colorado	
FROST, N. E.	Trans-Canada Pipe Lines Ltd. Calgary	Home
FUGLEM, M.	Oil & Gas Cons. Bd. Calgary	Home
FULTON, J. M.	Consultant Engineer Calgary	Home
FULTON W.	Dynamic Petroleum Products Ltd. Calgary	Home
FUNKHOUSER, J. H.	Woodley Canadian Oil Co. Calgary	Home
GAHRING, R. R.	Sinclair Oil & Gas Co. Anchorage, Alaska	
GALLAGHER E. J.	British American Oil Co. Ltd. Calgary	Home
GALLOWAY, J. O.	John O. Galloway Ltd. Calgary	Home
GALLUP, Wm. B.	Gallup, Buckland & Farney Ltd. Calgary	Home
GATES, D. E.	Managers Ltd. Calgary	Home
GILBERT, E. E.	Sun Oil Company Calgary	Home
GILBERT, G. W.	Geologist Calgary	Home
GILBREATH, C. D.	Fargo Oils Ltd. Calgary	Home
GILDERS, C. J.	Great Plains Dev. Co. Calgary	Home
GLAISTER, R. P.	Imperial Oil Ltd. Calgary	Home
GLENNIE, K. W.	Shell Oil Co. Edmonton, Alta.	Home
GOODWIN, J. Gordon	Seismic Service Supply1958 Limited Calgary	Home
GORRELL, H.A.	J.C. Sproule & Associates Calgary	Home
GOULD, D.	Canadian W.C. McBride, Inc. Regina, Sask.	

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
GOULD, R. G.	- Geologist Calgary.	Home
GOULD, W. C.	- Mount Dora, Florida.	
GRAYSTON, L. D.	British American Oil Co. Calgary.	Home
GREGGS, R. G.	Shell Oil Co., Calgary.	Home
GREGORY, A.	Geological Survey of Canada, Ottawa, Ontario.	Royal Hotel
GREIG, P. B. Jr.	Husky Oil & Refining Ltd., Calgary.	Home
GRIER, P. R.	Velocity - Sulmac, Calgary.	Home
GRIEVE, R. O.	Imperial Oil Ltd., Edmonton, Alberta.	
GRIFFIN, R. W. Jr.,	Canadian Kewanee Ltd., Calgary.	Home
GRINSFELDER, D.	Richfield Oil Corporation, Calgary.	Home
GROSSMAN, W. L.	Shell Oil Co., Calgary.	Home
GUYER, J. E.	Guyer Oil Company Ltd., Calgary.	Home
HALKERS, A. A.	Mobil Oil of Canada Ltd., Calgary.	Home
HALLADAY, I. R.	Pan American Petroleum Corp. Calgary.	Home
HAMILTON, R. J.	Hudson's Bay Oil & Gas Co. Ltd., Calgary.	Home
HAMANN, P. J.	Consulting Geologist, Calgary.	Home
HANEY, R.	J. H. Wilson & Assoc. Calgary.	Home
HARGREAVES, G. E.	Canadian Superior Oil of Calif. Calgary.	Home
HARKINS, K. L.	Sohio Pete. Co., Calgary.	Home
HARLAND, W. B.	University of Cambridge, Cambridge, England.	
HARRIS, D. M.	Woodley Canadian Oil Co., Calgary.	Home
HARRIS, J. W.	The Pure Oil Co., Calgary.	Home
HARRISON, J. M.	Geological Survey of Canada, Ottawa, Ontario.	
HARVEY, C. J.	Texas Pacific Coal & Oil Co., Fort Worth, Texas.	
HAY, R. E.	United Canso Oil & Gas, Calgary.	Home
HAYS, J. T.	- Lawyer Sullivan, Indiana.	
HAYES, R.	Phillips Petroleum Co., Calgary.	Home
HEATH, B.	University of Alberta - Student Calgary.	Home
HEATHCOTT, R. V.	Scurry - Rainbow Oil Co., Calgary.	Home
HEDBERG, H. D.	Gulf Oil Corporation, Pittsburgh, Pa.	
HEIFE, P.	Student - University of Alberta. Calgary.	Home
HENDERSON, J. W.	Phillips Petroleum Co., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
HERBALY, E.L.	Roston & Herbaly Petroleum Consultants Calgary	Home
HEWITT, T.B.	Hewitt Oil Company Calgary	Home
HILES, W.A.	Royalite Oil Co. Ltd. Calgary	Home
HILLERUD, J.M.	Student - Univ. of Alberta Edmonton	
HILTON, P.H.	Trans Canada Pipe Lines Ltd. Calgary	Home
HOBSON, G.D.	Geological Survey Manotick, Ont.	
HOGG, J.E.	Imperial Oil Ltd. Calgary	Home
HOLWAY, Wm.	Quebec Cartier Mining Co. Port Cartier, P.Q.	
HOLYK, W.	Texas Gulf Sulphur Co. Toronto	
HOKE, C.J.	Murphy Corp. El Dorado, Arkansas	
HOODMAKER, F.C.	Phillips Petroleum Company Calgary	Home
HOUGHTON, H.M.	Cons. Geophysicist Calgary	Home
HOWARD, R.A.	Kerr-McGee Calgary	Home
HOYLMAN, H.W.	Los Angeles, Calif.	
HUDSON, B.B.	Geophysical Associates of Canada Calgary	Wales Hotel
HUGHES, R.L.	V. Zay Smith Associates Ltd. Calgary	Home
HULL, J.P.D. Jr.	Kerr-McGee Oil Industries, Inc. Calgary	Home
HUNTER, M.J.	Student - McGill University Calgary	Home
HUPP, W.E.	Altana Exploration Co. Calgary	Home
HUMPHRIES, R.G.	The Toronto-Dominion Bank Calgary	Home
HUNTER, J.H.	Bank of Montreal Special Representative - Calgary	Home
HUTCHINSON, K. D.	Texaco Exploration Calgary	Home
ION, D. C.	Triad Oil Co. Ltd. Calgary	Home
IRWIN, Jos. S.	Consultant Calgary	Home
JANSONIUS, Jan	Imperial Oil Co. Ltd. Calgary	Home
JOHNSON, R. H.	Student, U. of A. Calgary	Home
JOHNSON, R. S.	Pacific Petr. Ltd. Calgary	Home
JOHNSTON, C. K.	Triad Oil Co. Calgary	Home
JONES, D. H.	Texaco Calgary	Home
JONES, G. H.	Consultant Calgary	Home
JUBB, W. M.	Texaco Exploration Calgary	Home
KAHANOFF, S.	Union Oil of California Calgary	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
KARPINKA, J.	Sun Oil Co., Calgary.	Home
KELLY, R.	Security Freehold Petroleums Ltd., Calgary.	Home
KENCAID, K.	Canadian Press, Calgary.	Home
KIDD, F. A.	Shell Oil Co., Edmonton, Alberta.	
KIDDER, H. J.	Mobil Oil of Canada, Ltd., Calgary.	Home
KIMMEL, Herbert O.	Imperial Oil Co. Ltd., Regina, Sask.	
KIRBY, G.	Amurex Oil Co., Calgary.	Home
KIRK, M. V.	Shell Oil Co., Seattle, Washington.	
KIRKER, W. P.	Texfel Pet. Corp., Calgary.	Home
KLAUI, P.	Independent, Calgary.	Home
KLIMCHUK, A. R.	Gallup, Buckland & Farney, Calgary.	Home
KLINCK, N. E.	Consultant, Calgary.	Home
KLINGSPOR, A.	Imperial Oil Ltd., Regina, Sask.	
KLINT, D. A.	Canadian Amco Ltd., Calgary.	Home
KNIPPING, H. D.	The British American Oil Co. Ltd., Calgary.	Home
KOCK, H. L.,	Shell Oil Co., Arcadia, California.	
KRAFT, J. C.	Shell Oil of Canada, Ltd., Calgary.	Home
LANCE, G. R.	Corp. of Engineers, U. S. A. Winnetha, Illinois.	
LANGSTON, J. F.	Denton - Spencer Co. Ltd., Calgary.	Home
LAVOIE, D.	Honolulu Oil Calgary.	Home
LEACH, D. E.	Instronics Ltd., Eastview, Ottawa, Ontario.	
LEBLANC, M. C.	Texaco Exploration Co., Calgary.	Home
LEGGE, J. A. Jr.	John A. Legge Jr. Ltd. Calgary.	Home
LERBEICMO, J. F.	University of Alberta. Edmonton, Alberta.	
LEWIS, C. R.	Texaco Canada, Ltd., Calgary.	Home
LEWIS, D. G.	Student, U. of Alberta. Calgary.	Home
LEWIS, J. W.	Consultant, Geologist, New York, N. Y.	
LEWIS, M. B.	Sinclair Canada Oil Co., Calgary.	Home
LINDEBURG, V.	Student, U. of Alberta, Edmonton, Alberta.	
LLOYD, A. M.	- Dallas, Texas.	
LLOYD, K. W.	Hudson's Bay Oil & Gas Co. Ltd., Calgary.	Home
LOCKIE, D. A.	British American Oil Co. Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
LORD, C. S.	Geological Survey of Canada, Ottawa, Ontario.	
LORINCZ, L.	University of Alberta, Calgary.	Home
LOSKAMP, H. K.	Union Oil Co. of Calif., Calgary.	Home
LOUCKS, W. A.	Calgary and Edmonton Corp., Calgary.	Home
LOVE, M.	Canadian Superior Oil of California, Calgary.	Home
LOWELL, K. A.	Honolulu Oil Corp. Calgary.	Home
LOWTHER, H.	Union Oil & Gas Corp. of Louisiana, Calgary.	Home
LUNDBERG, H. T.	Lundberg Explorations Ltd., Toronto, Ontario.	
LUNDBERG, S. T.	Lundberg Explorations Ltd., Toronto, Ontario.	
LUTZ, G. C.	Shell Oil Co., Salt Lake City, Utah.	
LYALL, H. B.	Shell Oil Co. of Canada, Edmonton, Alberta.	
LYNCH, M. J.	University of Alberta - Student Edmonton, Alberta.	
LYONS, J. V.	Verne Lyons Company, Calgary.	Home
MACAULEY, G.	Hudson's Bay Oil & Gas, Calgary.	Home
MACDONALD, W. D.	Bailey-Selburn Oil & Gas, Calgary.	Home
MACKENZIE, H. N. S.	Canadian Amco Limited, Calgary.	Home
MACMILLAN J. A.	Sun Oil Co., Calgary.	Home
MACNEILL, A.	Mobil Oil of Canada, Ltd., Calgary.	Home
MACKENZIE, A. A.	Blanchet and Assoc. Ltd., Calgary.	Home
MAGINLEY, H. B.	Texfel Petroleum Corp., Calgary.	Home
MAGNUSSON, K.	Alberta Chamber of Commerce, Calgary.	Home
MALLABONE, J. E.	Ranger Oil (Canada) Ltd., Calgary.	Home
MANN, H.	Shell Oil Co., Seattle, Washington.	
MARJANEN, L.	B. A. Oil Co., Calgary.	Home
MARSDEN, M.	Arctic Institute of North America, Montreal, Quebec.	
MARSHALL, E. W.	U.S.A. Snow Ice & Permafrost Research Est.. Wilmette, Illinois.	
MARTIN, R. E.	British American Oil Co. Ltd., Calgary.	Home
MATHEWS, T. C.	Exploration Services Inc. Fairbanks, Alaska.	
MATTINSON, C.	Shell Oil Co., Edmonton, Alberta.	
MAURITSEN, A. A.	Geophysical Consultant, Calgary.	Home
MAY, L. G.	The British American Oil Co. Ltd., Calgary.	Home
MCCABE, W. S.	Husky Oil & Refining Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
MCDONALD, L. R.	Midwest Diamond Drilling Ltd., Toronto, Ontario.	
MCFEELY, C. J.	Canadian Homestead, Calgary.	Home
MCCLUSKY, J.	Lundberg Explorations, Toronto, Ontario.	
MCCONNELL, F. C.	Velocity Surveys Ltd., Calgary.	Home
MCCULLOCH, R. B.	Calgary,	Home
MCGILL, W. P.	Velocity - Salmac, Oakville, Ontario.	
MCKINNON, F. A.	Triad Oil Co. Ltd., Calgary.	Home
MCMILLAN, G. W.	Tennessee Gas Trans. Calgary.	Home
MCMILLAN, N. J.	Tennessee Gas. Houston, Texas.	
MCMULLEN, R. M.	Imperial Oil Ltd., Calgary.	Home
MCNALLY, E. E.	Calgary.	Home
MEAD, R. G.	Cabeen Exploration Corp. Calgary.	Home
MENDENHALL, G. V.	The Pure Oil Co., Chicago, Illinois.	
METT, D. R.	Union Oil Co. of California, Calgary.	Home
MEYER, R. C.	Hudson's Bay Oil & Gas Co. Ltd., Calgary.	Home
MEYERS, N. A.	Honolulu Oil Corp. Calgary.	Home
MILLER, Ian. A.	C. D. C. - Decca, Ottawa, Ontario.	
MILLER, N. H.	United Geophysical Co. of Canada, Calgary.	Home
MILLWARD, L. G.	Bailey Selburn Oil & Gas, Calgary.	Home
MINIONS, J. R.	Sun Oil Co., Calgary.	Home
MOHR, C. L.	Colorado Oil & Gas Corp., Golden, Colorado.	
MOLLISON, R. D.	Texas Gulf Sulphur Co., Old Greenwich, Conn.	
MOORE, J. D.	Shell Oil Co., Olympia, Washington.	
MOORE, P. F.	Shell Oil Co., Bowness, Alberta.	Home
MORETTI, Dr. Frank J.	Imperial Oil Ltd., Calgary.	Home
MORRIS, M. B.	Hudson's Bay Oil & Gas Co. Calgary.	Home
MORRIS, P.	Stekoll Petroleum Corp., Calgary.	Home
MURPHY, G. B.	Texas Instruments Inc., Houston, Texas.	
MOURITSEN, G. A.	Beaver Geophysical Services Ltd., Calgary.	Home
MUECKE, G. K.	University of Alberta - Student, Calgary.	Home
NAYUDU, R. Y. Note: Correction in name of Mr. Nayudu.	University of Washington, Seattle, Washington.	
NELSON, H. H.	Canberra Oil Co. Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
NETTLETON, L. L.	Geophysical Associates, International, Houston, Texas.	
NEWALL, A. P. Jr.	Dynamic Pete. Products. Ltd., Calgary.	Home
O'BERTOS, J. J.	Sun Oil Co., Calgary.	Home
O'BRIEN, J. O.	Tennessee Oil & Gas, Calgary.	Home
O'CONNOR, R. H.	Placid Oil Co., Calgary.	Home
OLIVER, T.	University of Alberta in Calgary, Calgary.	Home
OLSEN, B. L.	Shell Oil Co of Canada Ltd., Edmonton, Alberta.	
ONTKO, J. J.	Plymouth Oil Co., Calgary.	Home
OSBORN, B.	Continental Oil Co., Anchorage, Alaska.	
OSTENSO, N. A.	University of Wisconsin, Madison, Wis.	
OWEN, E. W.	Southern Minerals Corp. and U. of Texas, San Antonio, Texas.	
OWEN, R. M. S.	Consultant, Calgary.	Home
PACIFIC PET. LTD.,	Pacific Petroleums Ltd., Calgary.	Home
PAGE, P. E.	Edmonton, Alberta.	
PALSGROVE, J. H.	L-M Oil Co., Calgary.	Home
PANASIUK, W.	Stekoll Oil & Gas, Calgary.	Home
PATTERSON, A.	Exploration Consultants Inc. Calgary.	Home
PATTERSON, A.	Western Decalta, Calgary.	Home
PATTERSON, D. C.	United Canso Oil and Gas Ltd., Calgary.	Home
PERRY, R. G.	Consultant, Calgary.	Home
PHIPPS, W. W.	Bradley Air Services Ltd., Ottawa, Ontario.	
PIERCE, J. M.	Ranger Oil (Canada) Ltd., Calgary,	Home
POCOCK, N. A.	Charter Oil Co., Calgary, Alberta.	Home
POCOCK, S. A. J.	Imperial Oil Ltd., Calgary.	Home
PORTER, R. J.	Union Oil of California, Calgary.	Home
POTTER, D. L.	Phillips Petroleum Co., Calgary.	Home
PRENDERGAST, J. R.	Canadian Aero Service Ltd., Calgary.	Home
PRICE, L. L.	Geological Survey of Canada, Calgary.	Home
PUGH, D. C.	Geological Survey of Canada, Calgary.	Home
RAGLE, R. H.	U. S. Army Corps of Engineers, South Royalton, Vermont.	
RAINIER, P. W.	A. S. P. G., Calgary.	Home
RAMSEY, E. A.	Atlas Well Operators, Edmonton, Alberta.	

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
RATCLIFFE, J. H.	Lundberg Explorations Ltd., Toronto, Ontario.	
REBMAN, J. H.	Sinclair Canada Oil Company, Calgary.	Home
REDGATE, H. G.	Richfield Oil Corp. Calgary.	Home
RENDALL, G. A.	Geology Student - U. of Alberta. Edmonton, Alberta.	
RHODES, R. B.	Altana Exploration Co., Cut Bank, Montana.	
RICKEL, W. K.	Amerada Petroleum Corp. Calgary.	Home
RIDDELL, P. E.	Calgary.	Home
ROBINSON, E.	MEIC, Calgary.	Home
ROGERS, M. A.	Plymouth Oil Co., Calgary.	Home
ROSEN, D.	David Rosen & Associates, New York, N. Y.	
RUMSEY, I. A. P.	California Standard Co., Calgary.	Home
RUTGERS, A. T. C.	Northern Natural Gas Co., Calgary.	Home
SADLER, W. F.	The Toronto - Dominion Bank, Calgary.	Home
SANDERS, E.	Welex of Canada, Ltd., Calgary.	Home
SCHLITT, A. G.	Geo-Technical Development Co. Ltd. Toronto, Ontario.	
SCHMIDT, A. R.	Student - University of Alberta. Calgary.	Home
SCHULTZ, E.	Sun Oil Co., Calgary.	Home
SCHWAB, R.	Consultant, Calgary.	Home
SCOTT, D.	University of Alberta. Edmonton, Alberta.	
SCOTT, J. C.	Husky Oil & Ref. Ltd., Calgary.	Home
SERAFINI, B.	Altana Expl. Co., Calgary.	Home
SHATFORD, R. A.	Calgary,	Home
SHAW, E. W.	Imperial Oil Ltd., Calgary.	Home
SHEEKY, W.	Northwest Gas & Oil Exploration Co., New York, N. Y.	
SHOEMAKER, R. W.	The Ohio Oil Co., Anchorage, Alaska.	
SHOULDICE, D. H.	Shell Oil Co., Edmonton, Alberta.	
SHOULDICE, J. R.	Imperial Oil Ltd., Calgary.	Home
SHUMWAY, G.	U. S. Navy Electronics Laboratory, La Jolla, California	
SIEGEL, F.	Sun Oil Co., Calgary.	Home
SLAGLE, M. M. Jr.	Texas Pacific Coal & Oil Co., Fort Worth, Texas.	
SLEMCO, W.	Decalta, Calgary.	Home
SMITH, J. H.	Bailey Selburn, Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
SMITH, P. N.	Seismic Service Supply Ltd., Calgary.	Home
SMITH, R. J. H.	Imperial Oil Ltd., Calgary.	Home
SMITH, V. Zay,	V. Zay Smith Associates, Ltd., Calgary.	Home
SMYLIE, R. N.	Alpine Smylie Sports, Calgary.	Home
STATLER, J. J.	United Producing Company, Calgary.	Home
STAUFFER, W.,	Student - University of Alberta. Calgary.	Home
STEEN, G. E.	University of Alberta. Edmonton, Alberta.	
STEIN, C.	Richfield Oil Corp., Calgary.	Home
STEINER, Johann	University of Alberta. Edmonton, Alberta.	
STELCK, C. R.	University of Alberta. Edmonton, Alberta.	
STEPHEN, J. D.	Alminex Ltd., Calgary.	Home
STEPHENS, R. E.	University of Alberta. Edmonton, Alberta.	
STEPHENS, I. D.	Sinclair Canada Oil Co., Calgary.	Home
STEVENSON, J. R.	Kerr-McGee Oil Ind. Inc. Calgary.	Home
STEVENSON, P.	Mines Branch, Ottawa, Ontario.	
STEWART, D. P.	Texfel Petroleum Corp., Calgary.	Home
STEWART, H. L.	Sun Oil Co., Calgary.	Home
STIRLING, A. J.	Richfield Oil Corp., Calgary.	Home
STITES, R. L.	The Ohio Oil Company, Los Angeles, California.	
STITT, R. L.	Aero Service Corp., Alexandria, Va.	
STOREY, T. P.	Husky Oil & Refining Co., Calgary.	Home
STOUT, J. G.	Shell Oil Co. of Canada, Edmonton, Alberta.	
STRAND, J. A.	The British American Oil Co.,Limited, Calgary.	Home
STUART SMITH, J. H.	Whitehall Canadian Oils Ltd., Calgary.	Home
SULLIVAN, J. J.	The British American Oil Co., Limited, Calgary.	Home
SWAN, A. G.	American Climax Petroleum Corp., Calgary.	Home
SWIFT, J. H.	Pan American Pete. Corp., Calgary.	Home
TAFT, J.	Phillips Petroleum, Calgary.	Home
TAYLOR, D. W.	British American Oil Company, Calgary.	Home
TAYLOR, J. N.	L-M Oil Co., Calgary.	Home
TEITZ, H.	Own Business, Calgary.	Home
TEMPLETON, C. W.	Devon Palmer Oils, Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
TEXACO(EDMONTON DIST.)	Calgary.	Home
THOMPSON, C. E.	Meteorological Service, Dept. of Transport, Edmonton, Alberta.	
THOMPSON, H. A.	Meteorological Service, Dept. of Transport, Edmonton, Alberta.	
THOMPSON, J. G.	Imperial Oil Ltd., Calgary.	Home
TIBBITT, H. R.	Petcal Co. Ltd., Calgary.	Home
TIFFIN, H. B.	Altana Exploration Company, Calgary.	Home
TISDALL, W. H.	Sun Oil Company, Calgary.	Home
TOKARSKY, O.	Shell Oil Co., Edmonton, Alberta.	
TORODE, A. R.	Shell Oil Co. of Canada, Edmonton, Alberta.	
TRETTIN, H. P.	D. Bruce Bullock & Associates, Calgary.	Home
UHL, W. C.	Palmer Publications, Inc. New York, N. Y.	
UMIKER, R. S.	Sun Oil Co., Calgary.	Home
VAASJO, T.	Municipal Airport, Edmonton, Alberta.	
VAN OS, B.	Richfield Oil Corp., Calgary.	Home
VAN TINE, A. B.	Home Oil, Calgary.	Home
VEILLEUX, B. M.	Shell Oil Co. of Canada, Edmonton, Alberta.	
VERHOEFF, F. H.	Westcoast Transmission Co. Ltd., Calgary.	Home
WALKER, A. A.	Phillips Pet. Co., Bartlesville, Oklahoma.	
WALKER, C. T.	Pan American Pete. Corp. Calgary.	Home
WALKER, D. S.	Triad Oil Co., Calgary.	Home
WALLA, J. Jr.	Northern Natural Gas Co., Calgary.	Home
WALLACE, J. A.	Arabian American Oil Co., Saudi Arabia.	
WALLER, R. M.	U. S. Geological Survey, Anchorage, Alaska.	
WALPER, J. L.	University of Tulsa, Tulsa, Oklahoma.	
WEBB, J. B.	Alminex Ltd., Calgary.	Home
WEBBER, E. J.	None. Fairbanks, Alaska.	Braemar Lodge
WEIHMANN, I.	British American Oil Company, Calgary.	Home
WELLS, G. C.	Imperial Oil, Calgary.	Home
WESTBURY, R. S.	Texaco Canada Ltd., Calgary.	Home
WHITE, Peter H. N.	Imperial Oil Limited. Calgary.	Home
WHITESIDE, F. C.	Hudson's Bay Oil and Gas Co. Ltd., Calgary.	Home
WIGGINS, J.	L-M Oil Co. Ltd., Calgary.	Home

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NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
WIGHT, R.	Johnston Testers Co., Calgary.	Home
WILDERMAN, G. H.	Big Indian Drilling Co. Ltd., Calgary.	Home
WILKINSON, H. N.	Student - University of Alberta. Calgary.	Home.
WILLIAMS, F. J.	Consumers' Co-operative Ref. Ltd., Saskatoon, Sask.	
WILLIAMS, R. R.	Canadian Bishop Oil, Calgary.	Home
WILLIAMSON, C. W.	University of Alberta, Edmonton, Alberta.	
WILLIS, G. F.	Canadian Superior Oil of Calif. Calgary.	Home
WILLMOT, R.	Willmot Associates, Don Mills, Ontario.	
WILSON, J. T.	University of Toronto, Toronto, Ontario.	
WILSON, P. C.	Sohio Pet. Co., Calgary.	Home
WILTON-CLARK, H.	Sarcee Petroleums Limited, Calgary.	Home
WONFOR, J. S.	The British American Oil Co. Ltd., Calgary.	Home
WOOD, T. E.	Bailey Selburn Oil, Calgary.	Home
WOOFTER, B. M.	Texaco Exploration Co., Calgary.	Home
WORDBEC, J. W.	Phillips Pete. Co., Calgary.	Home
YEOMAN, A. H.	Self Employed, Calgary.	Home
YOUELL, G. W.	Oil Field Engineering Services Ltd., Edmonton, Alberta.	
YOUNGREN, C. E.	L-M Oil Co. Ltd., Calgary.	Home
ZARUDSKI, E. F. K.	Pan American Pete. Corp., Calgary.	Home
ZIEGLER, W. H.	Imperial Oil Limited, Edmonton, Alberta.	
ZWARTENDYK, J.	Texaco Exploration Co., Calgary.	Home

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SUPPLEMENT (2)

NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
BASARABA, K.	West Can. Oil & Gas Ltd. Calgary	Home
BOKMAN, J.	Western Can. Venture, Ltd. Calgary	Home
BRUNT, G. M.	Amerada Pet. Corp., Calgary	Home
BRYNELSEN, B.	Choqua Oil Co. Ltd. Vancouver	
CHURCHILL, J. M.	Shell Oil Co. Calgary	Home
CLEMIS, W. L.	Can. Fina Oil Ltd. Calgary	Home
CRAIG, Gerald	Student, U. of A. Edmonton, Alta.	
EKLUND, Carl R.	U.S. Army Office - Research and Development - Washington, D.C.	
GARDE-HANSEN, H.	Canpet Exploration Ltd. Calgary	Home
GULLIVER, R. A.	Shell Oil Co. Calgary	Home
JOHNSTON, A. H.	Union Oil Co. of California Calgary	Home
JONES, Daniel L.	Canada Cities Petr. Corp. Calgary	Home
IRVIN, Louis	Texaco Canada Ltd. Calgary	Home
LAMON, R. S.	Northern Nat. Gas Prod. Co. Calgary	Home
LAWLESS, D. I.	Can. Bishop Oil Ltd. Calgary	Home
MacDONALD, J. I.	Independent Geologist Calgary	Home
MacMILLAN, Geo.	Calif. Standard Co. Calgary	Home
McKENNA, W. J.	Texaco Exploration Calgary	Home
McLEOD, G. J.	Can. Devonian Pet. Ltd. Regina, Sask.	
MINCHIN, J.	Texaco Canada Calgary	Home
MURPHY, Joe	Consultant Calgary	Home
MYERS, Wm. H.	Consultant Calgary	Home
OSMENT, F. C.	Pan American Pet. Corp. Calgary	Home
PRETTY, Lyle	Union Oil & Gas Corp. of Louisiana Calgary	Home
RENNIE, E. W.	Tidewater Oil Co. Calgary	Home
RIGSBY, G. P.	Arctic Institute of North America San Diego, Calif.	
STAPLIN, F. L.	Imperial Oil Ltd. Calgary	Home
STERNBERG, C. W.	Amurex Calgary	Home
WESEMANN, R.	Consultant Calgary	Home
WOLF, Ed.	Altair Oil & Gas Co. Calgary	Home
WRIGHT, D. G.	Canada Cities Service Pet. Ltd. Calgary	Home

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SUPPLEMENT (3)

NAME	AFFILIATION	RESIDENCE WHILE ATTENDING SYMPOSIUM
HARTH, W.	Student, U. of A. Calgary	Home
MEEKER, John C.	Pan Am. Pet Corp. Calgary	Home
PORTER, J. W.	Can. Sup. Oil of Calif. Calgary	Home
SCRIMSHAW, F. W.	Champlin Oil & Ref. Calgary	Home
VINCENT, L. P.	Johnston Testers Ltd. Calgary	Home

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LEGEND

Marine facies.

☐ Clayish deposits of the lower sublittoral.

☐ Clayish-aleuritic deposits of the upper sublittoral.

☐ Sandy deposits of the upper sublittoral and littoral.

Facies of the basins with abnormal salinity.

☐ Predominant clayish - -aleuritic deposits.

☐ Predominant sandy deposits.

Lagoonal facies

▨ Predominant clayish - -aleuritic deposits.

▨ Predominant sandy deposits.

▨ Continental facies

— — Coalbearing facies

v v v Volcanic rocks

Sources of sediment.

☐ Gneiss-formations.

☐ Schist-formations.

▨ Formations of Carbonate rocks (Paleozoic)

▨ Terrigenous formations (Permian) with trapp sills.

☐ Volcanic formations (Lower Triassic).

☐ Terrigenous formations (Permian and Mesozoic).

▨ Granitic rocks.

⋯ Limits of the marine transgression.

← Course of load transportation.

⇦ Course of migration of marine fauna.

Legend for the Quaternary.

☐ Seas and lakes

☐ Main rivers

▨ Lowlands

▨ Plains of denudation and low plateaus

■ High plateaus

▨ Uplands

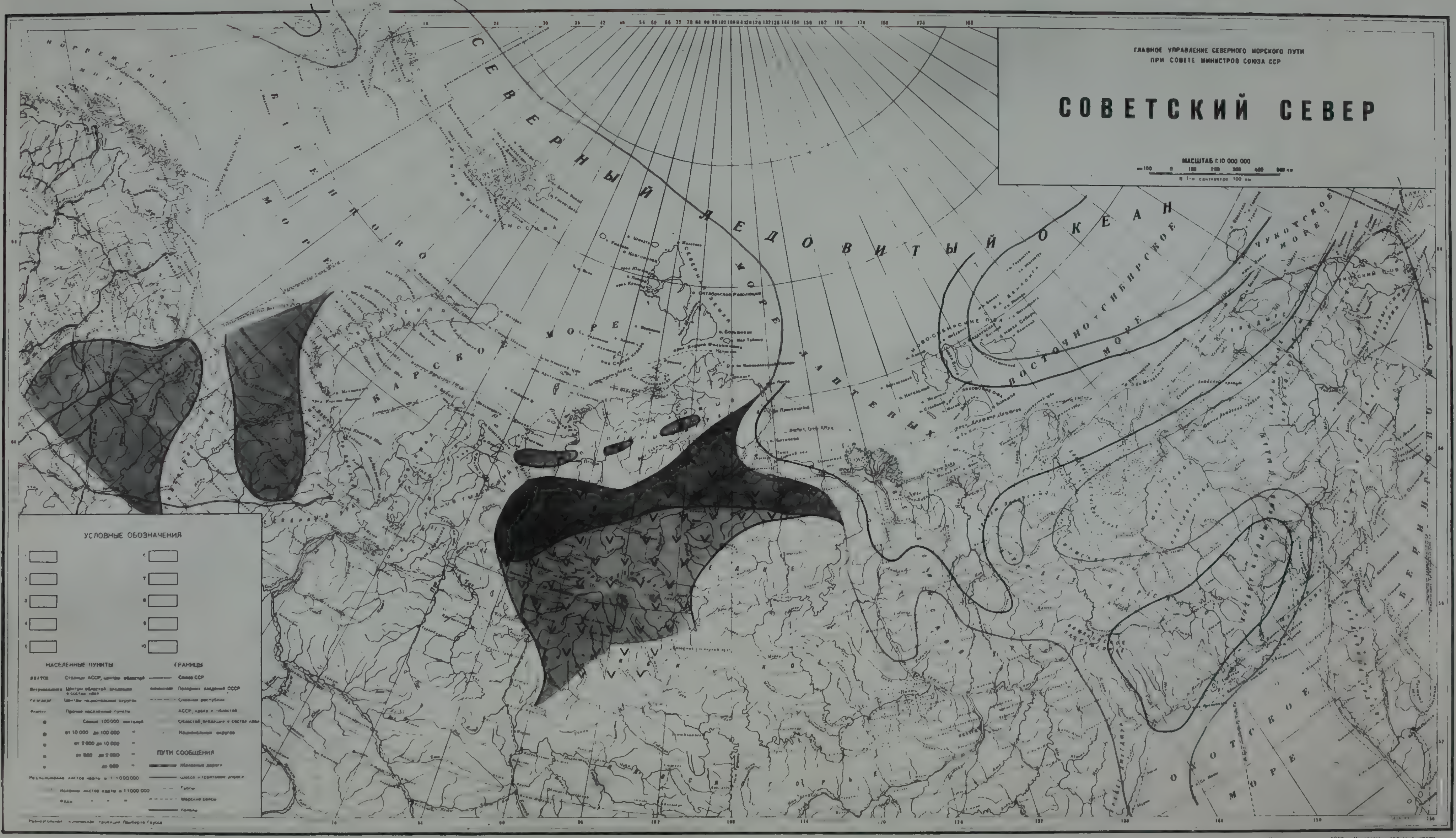
▨ Mountains

☐ Boundary of the ice-sheets

☐ Defined Boundary of the active parts of glaciers

☐ Main course of the ice flow

ИНДСКИЙ ВЕК /Jnduan/



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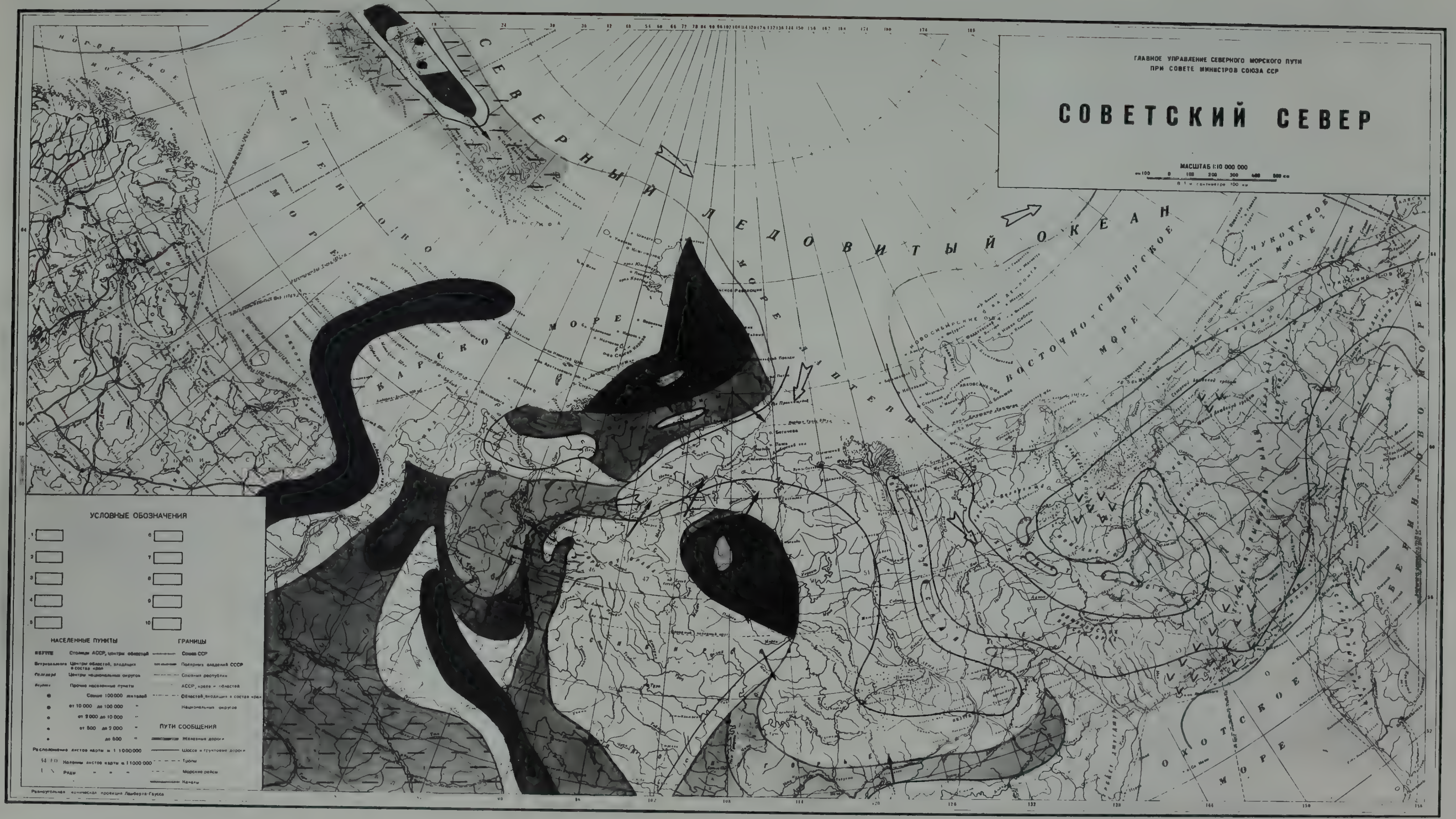
ДОМЕР /Domer./



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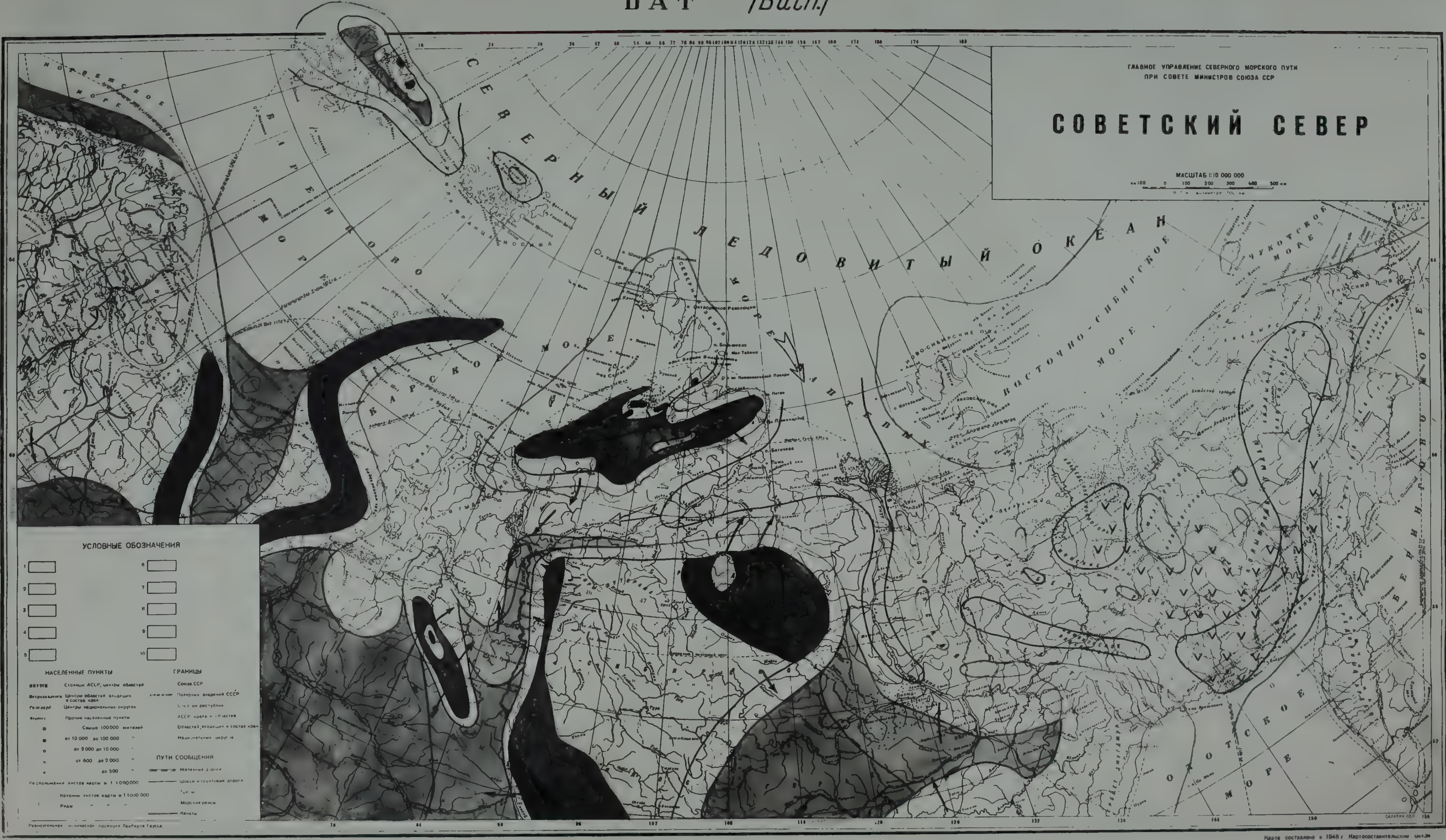
БАТ /Bath./



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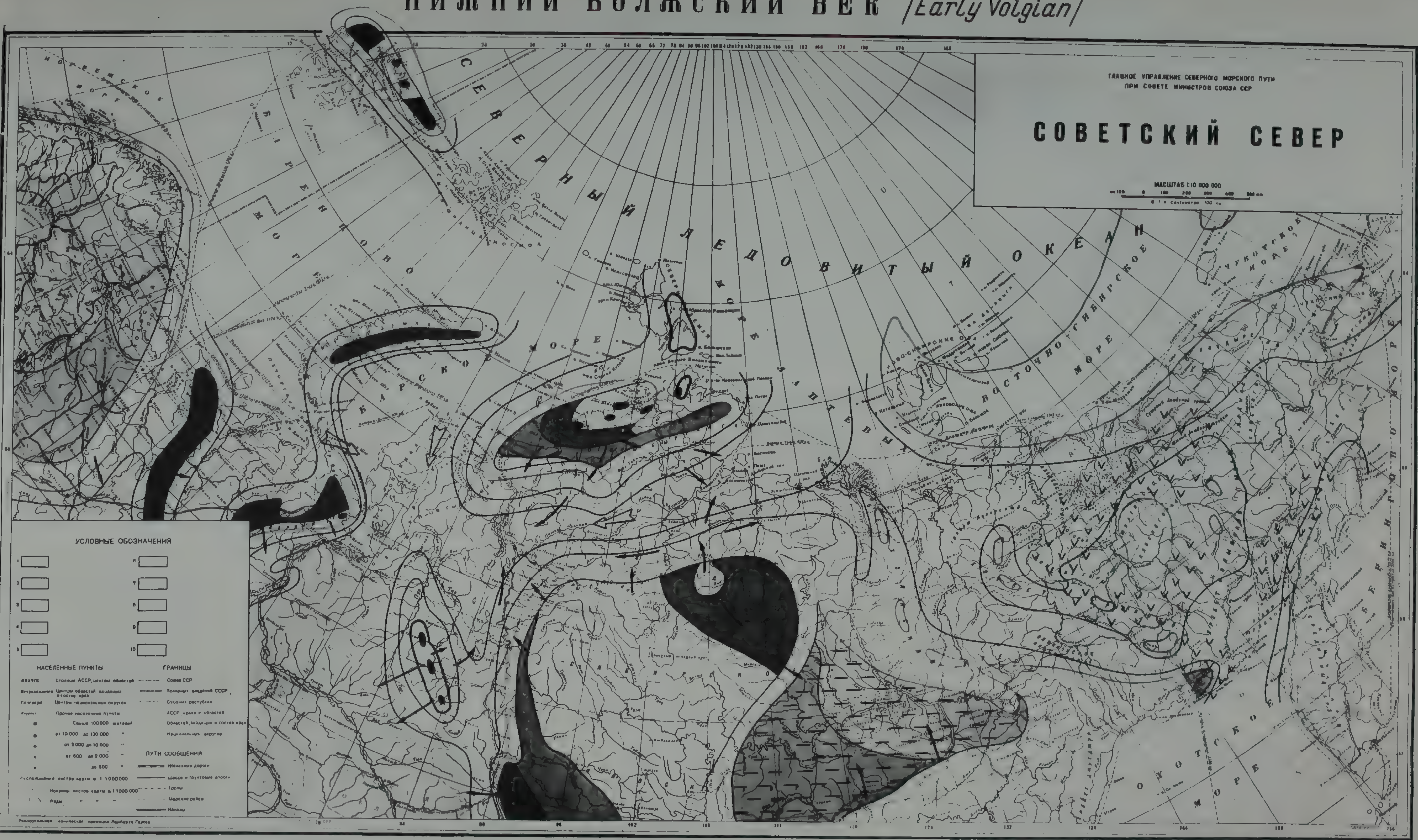
НИЖНИЙ ВОЛЖСКИЙ ВЕК /Early Volgian/



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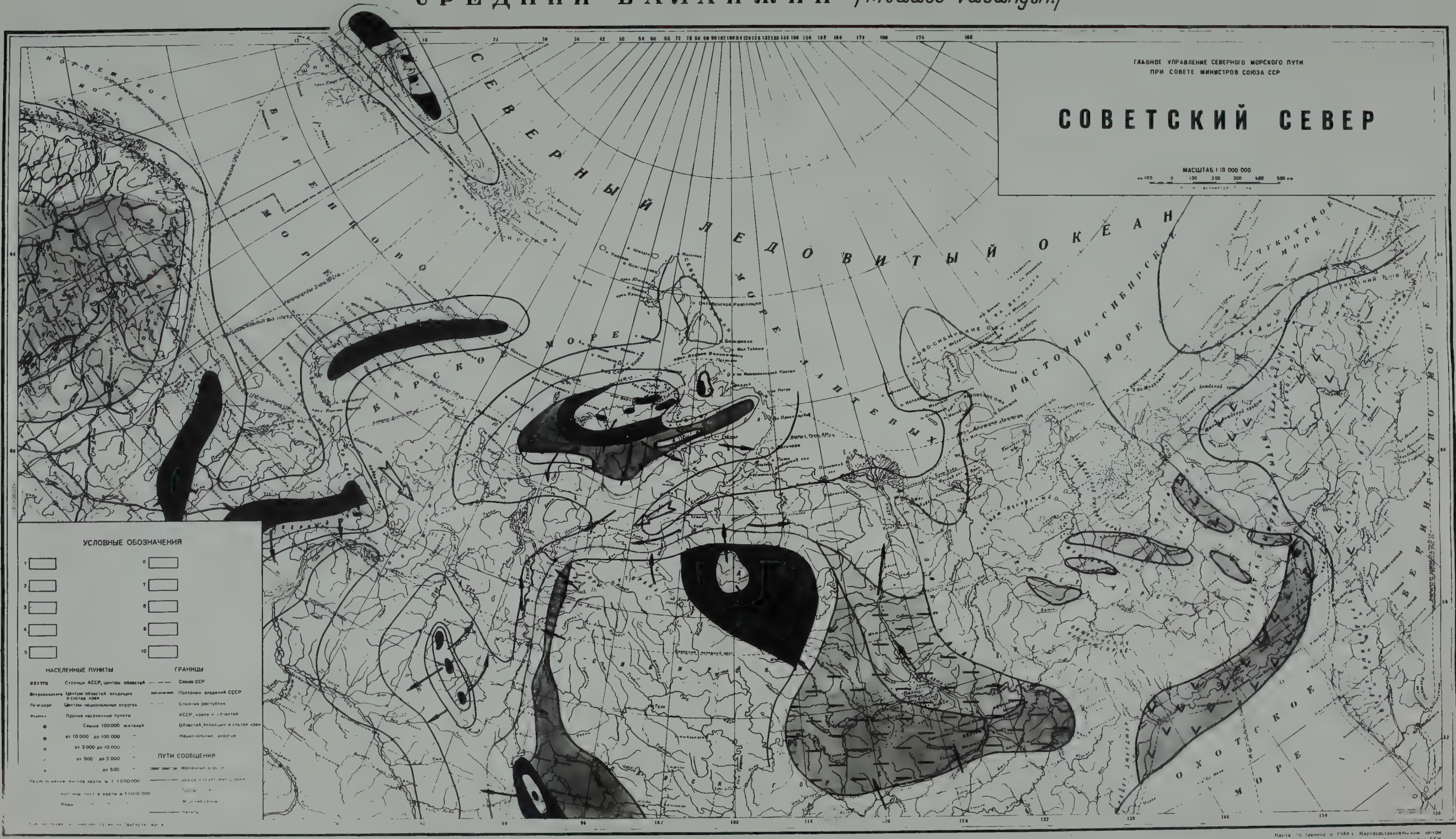
СРЕДНИЙ ВАЛАНЖИН /Middle Valangin./



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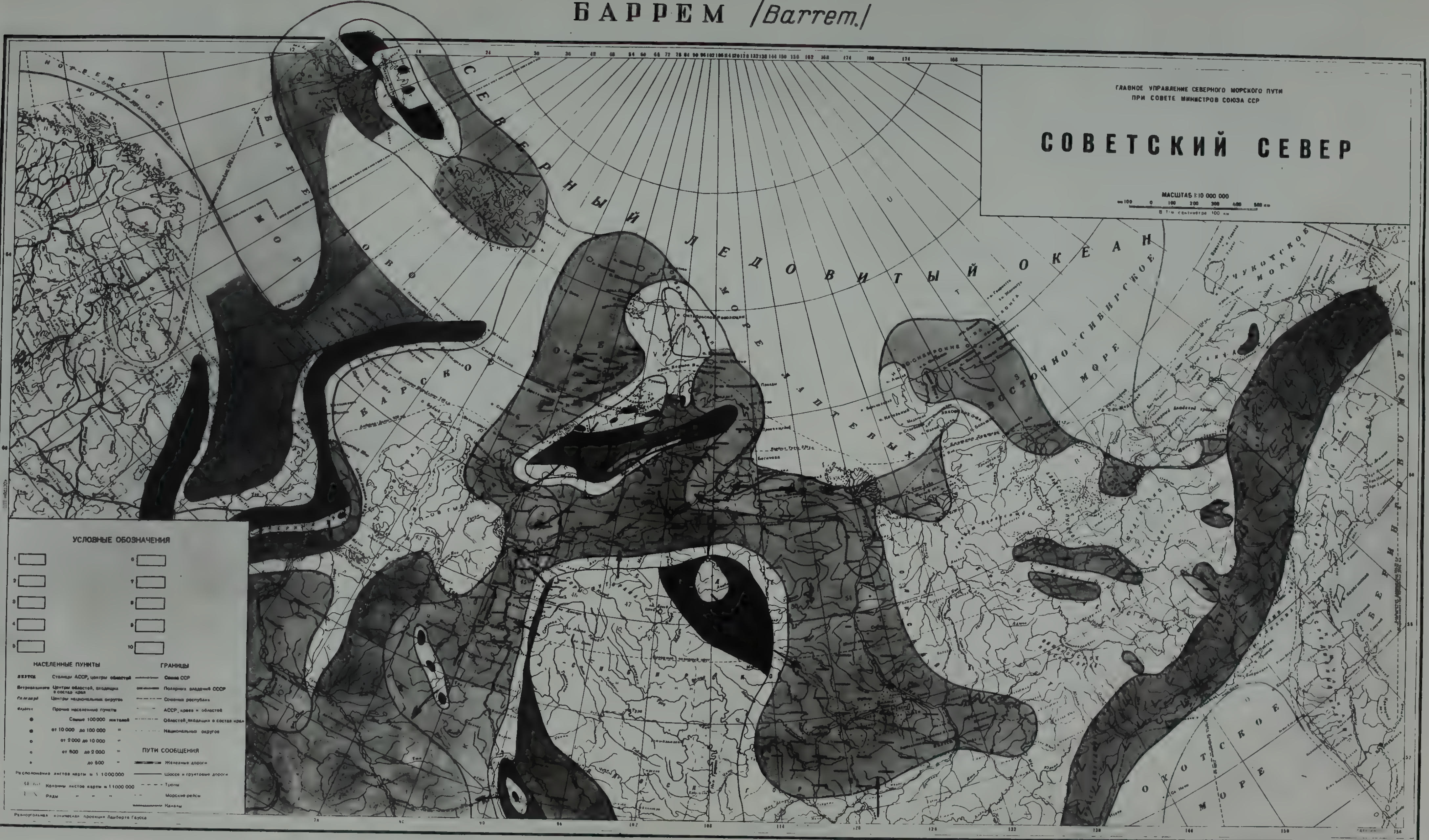
БАРРЕМ /Barrem./



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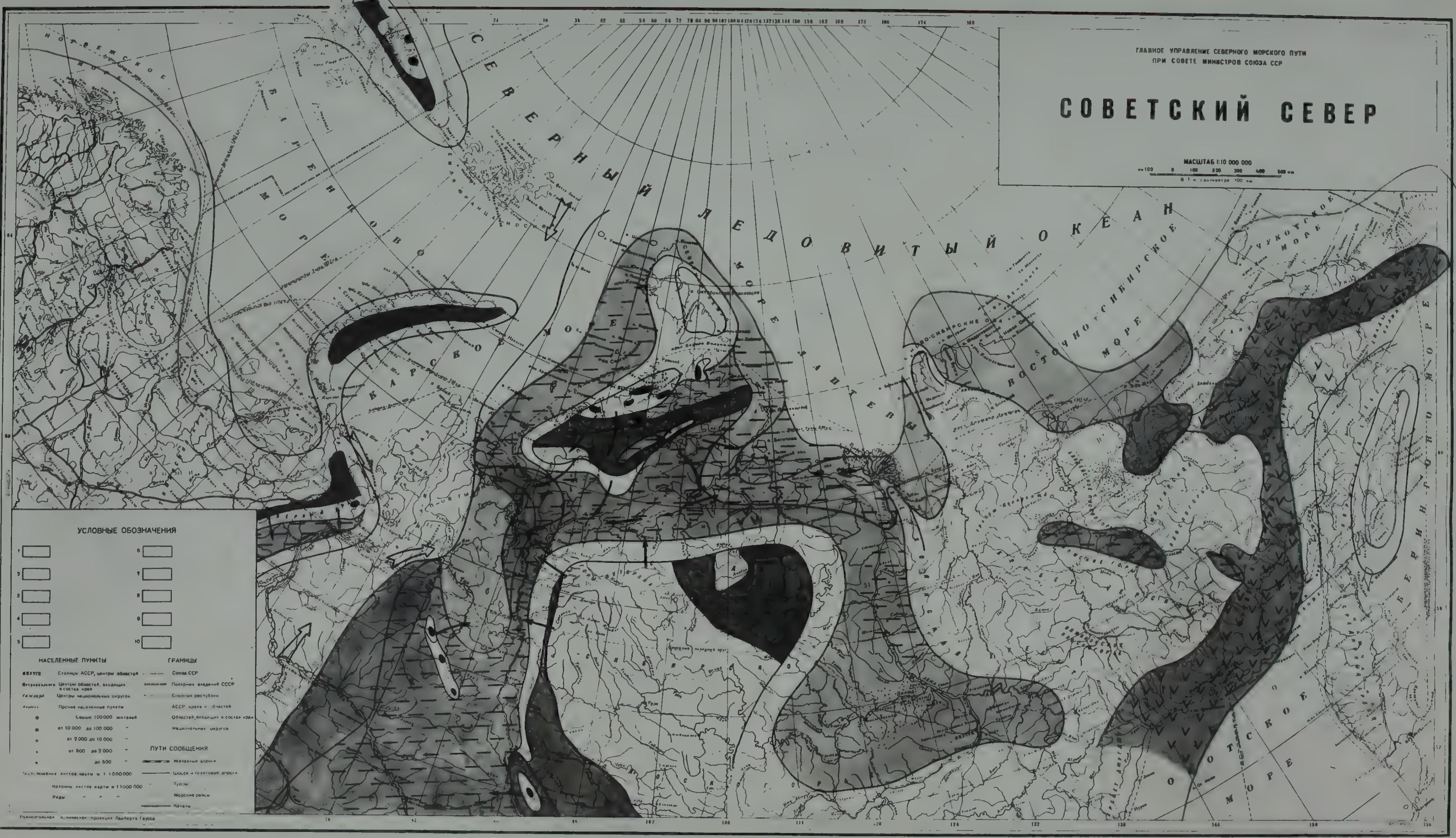
АЛЬБ /Alb./



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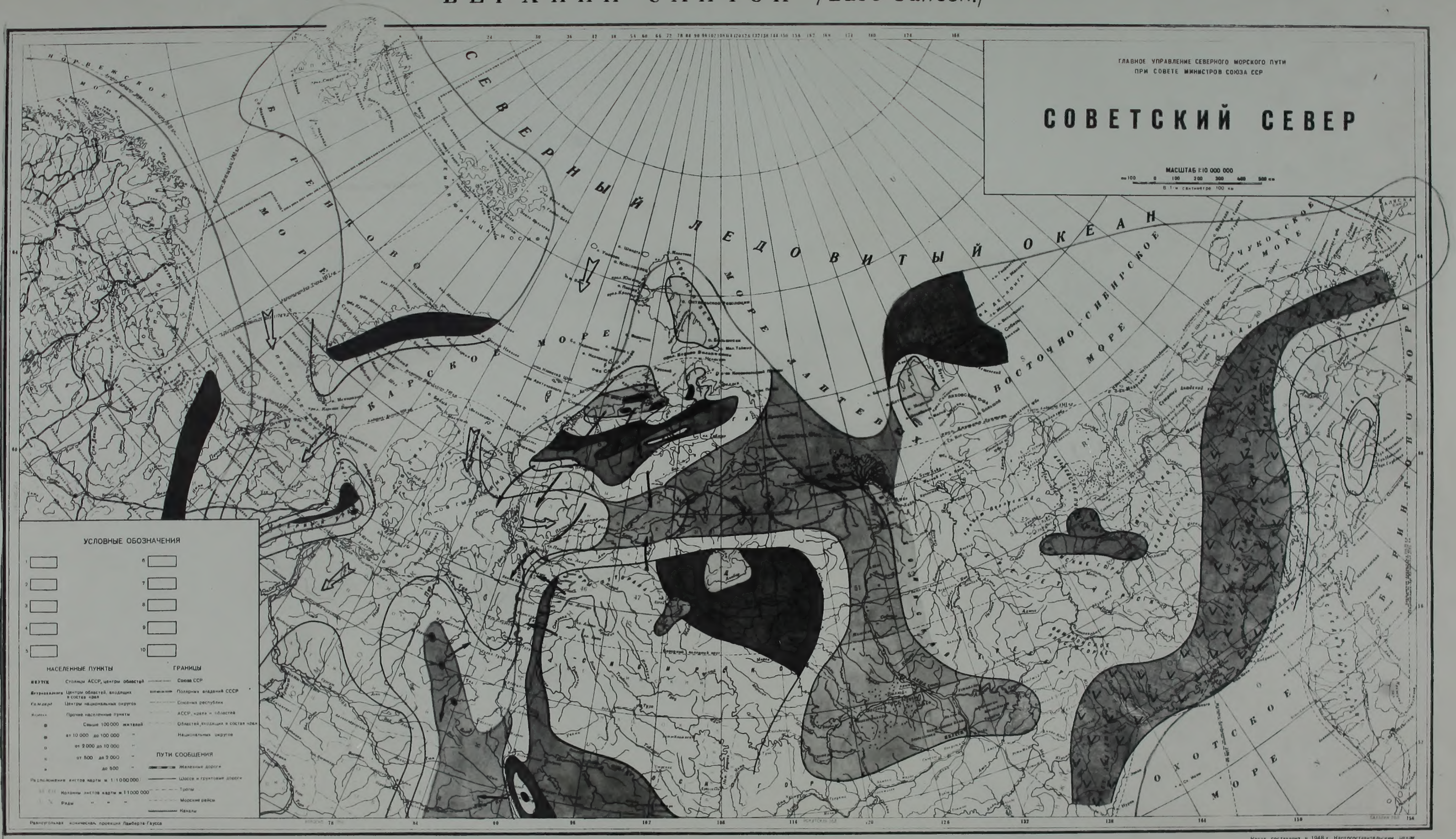
ВЕРХНИЙ САНТОН /Late Santon./



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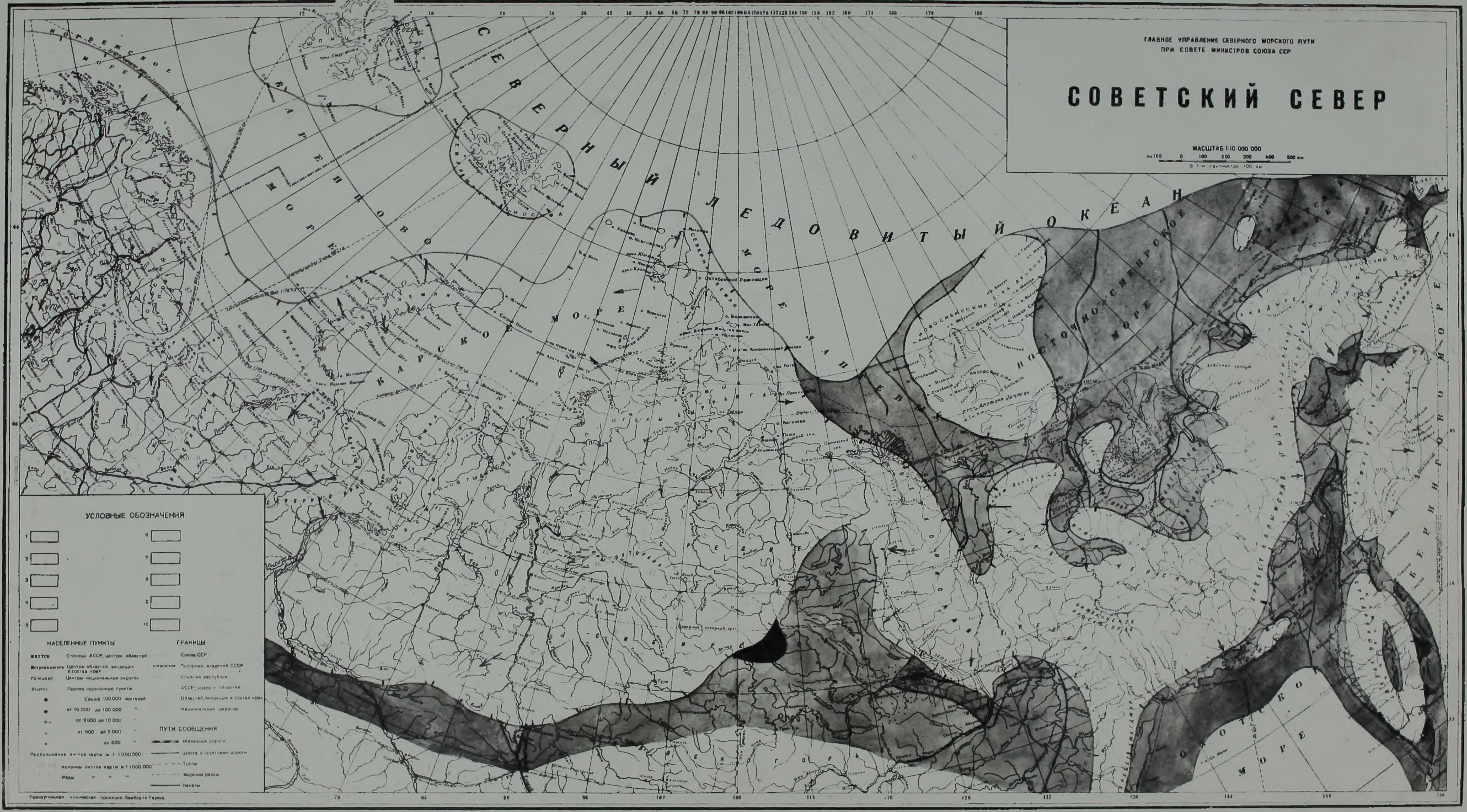
ВЕК МАКСИМАЛЬНОГО ОЛЕДЕНЕНИЯ

The Age ot the Maximum Glaciation



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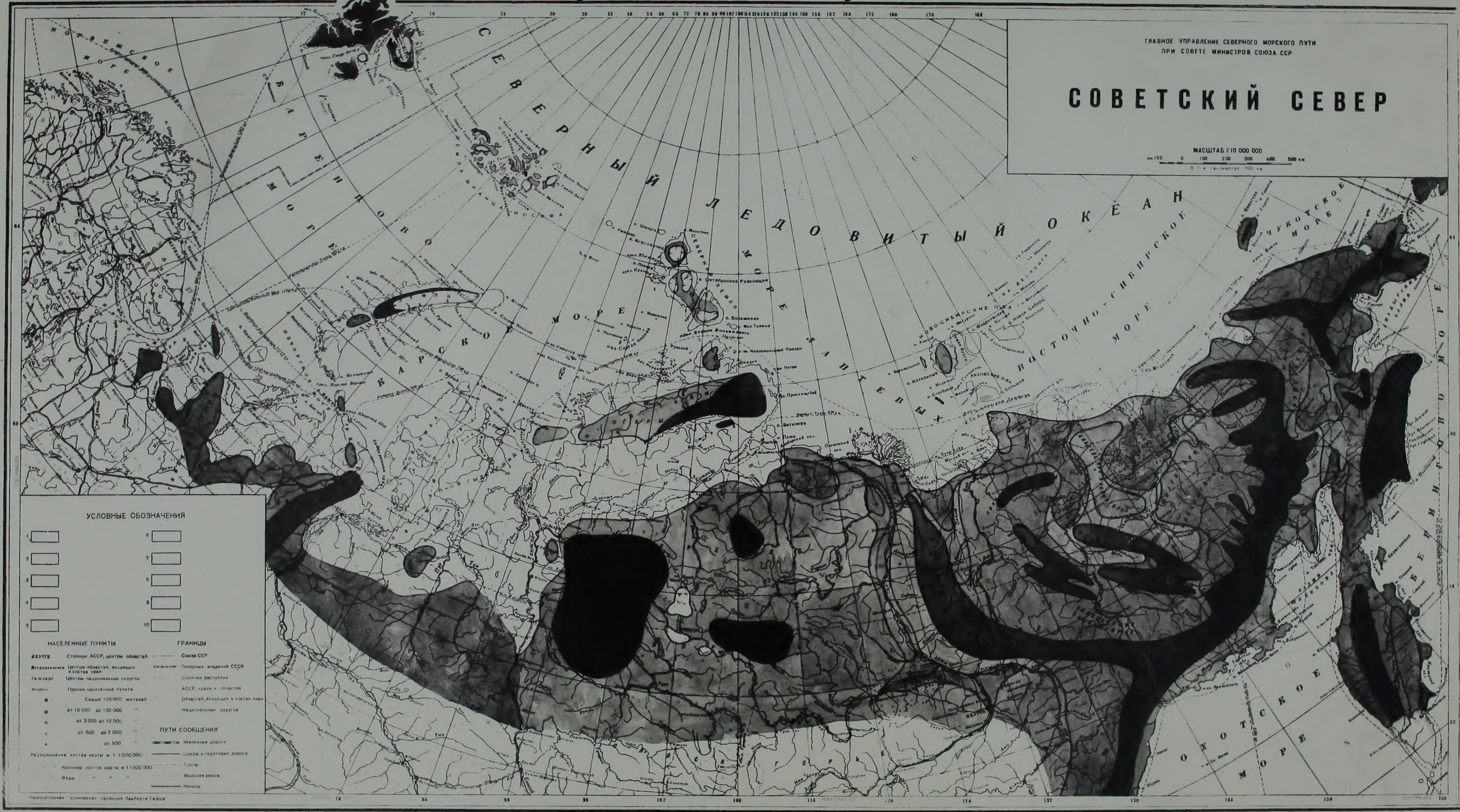
ВЕК БОРЕАЛЬНОЙ ТРАНСГРЕССИИ
The Age of the Boreal Transgression



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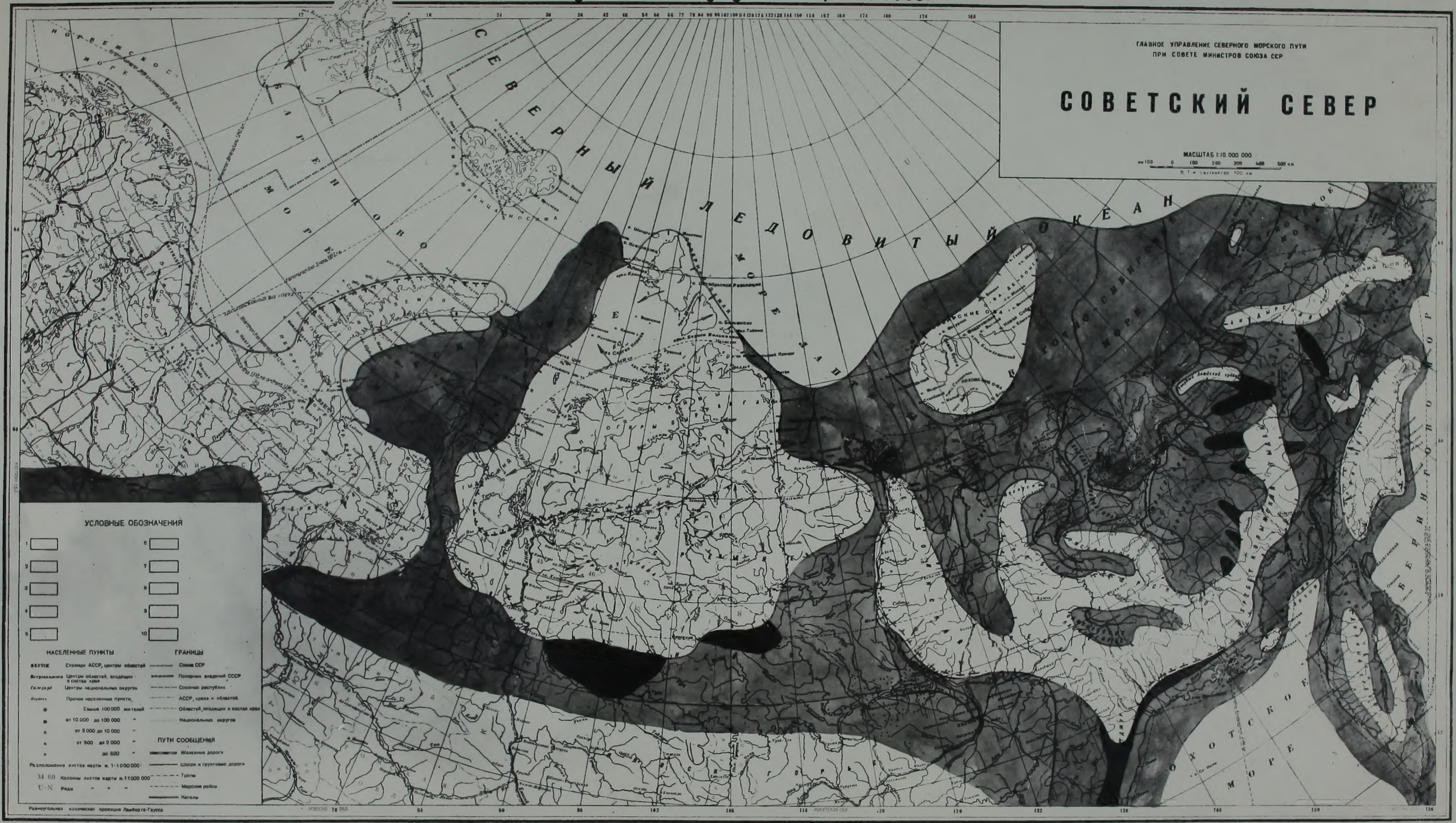
ВЕК ЗЫРЯНСКОГО ОЛЕДЕНЕНИЯ

The Age ot the Zyryanka Glaciation



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